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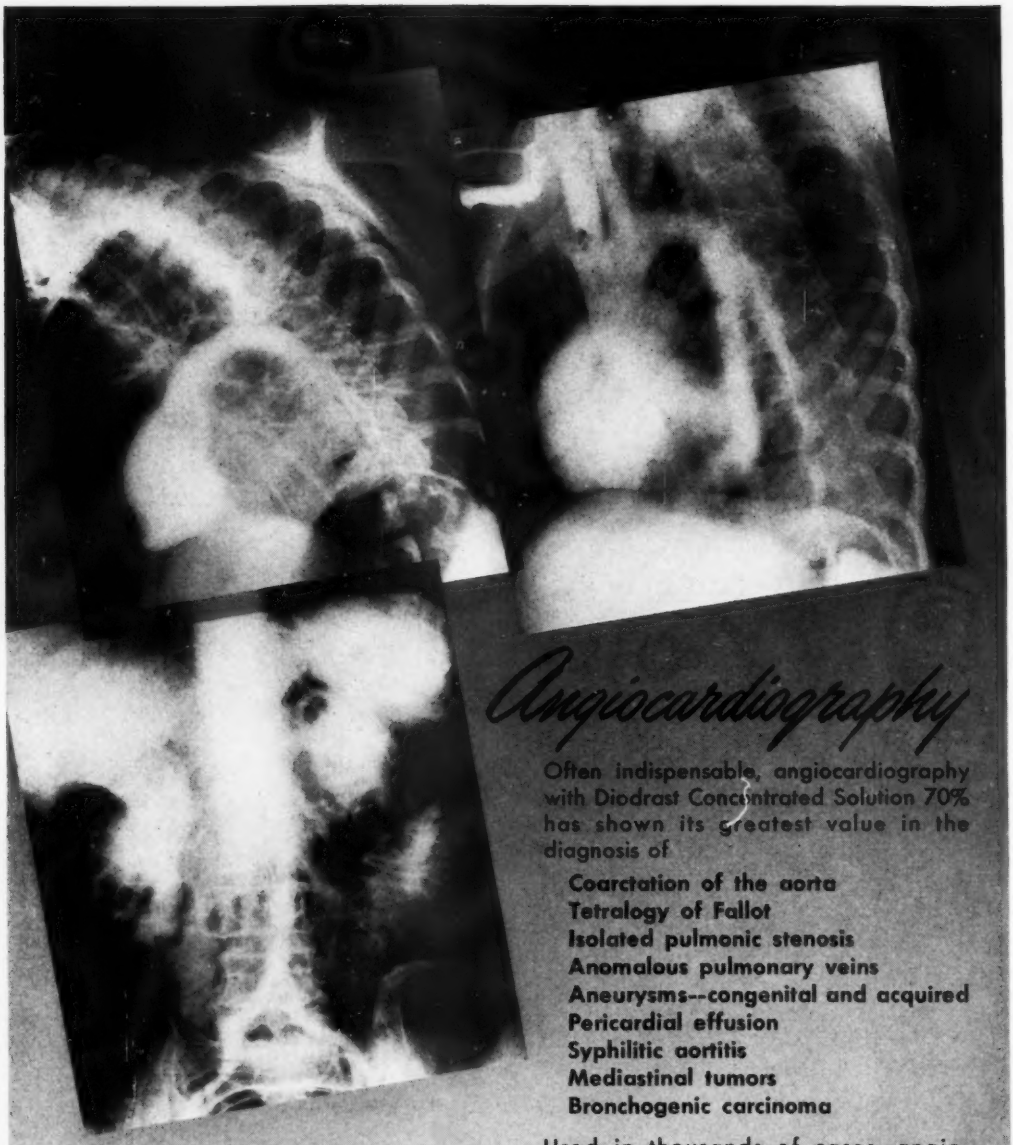

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Treatment of Erythroblastosis Fetalis By Exchange Transfusion

ALEXANDER S. WIENER*

BROOKLYN

In this presentation will be summarized our experiences in a series of 80 cases of erythroblastosis fetalis treated by exchange transfusion.† Of the 80 cases, 76 were typical instances of Rh sensitization and included 2 sets of twins, while 4 were due to A-B sensitization.

RATIONALE

The use of exchange transfusion in the treatment of erythroblastosis is based on recent discoveries concerning the pathogenesis of the disease. Following the discovery of the Rh factor by Landsteiner and Wiener,[1,2] Levine and his collaborators[3,4] pointed out the role of isosensitization of the mother to the Rh factor in producing the disease in the fetus and newborn infant. In typical cases, the Rh-negative expectant mother has become sensitized as the result of a previous birth of an Rh-positive infant, or, less commonly, as the result of an injection of Rh-positive blood. The Rh antibodies produced by the maternal organism pass through the placenta into the fetal circulation, and if the fetal blood is Rh positive, one or another manifestation of erythroblastosis results.

In the original hypothesis of Levine, et al., the Rh antibodies were assumed to be agglutinins, but it was soon found that often in the most severe instances of isosensitization resulting in stillbirths, no Rh agglutinins were demonstrable in the maternal serum. Wiener[5,6] then postulated the existence of a second type of Rh antibody capable of combining with Rh-positive cells in saline media, but without clumping them. He devised a successful test for demonstrating these Rh antibodies, the blocking test,[5] and the antibodies were accordingly designated as Rh-blocking antibodies. These observations were confirmed in independent experiments of Race[7] and Diamond,[8] conducted while preparing Rh testing sera.

To account for the difference in behavior of the two varieties of antibodies, Wiener[9] postulated that the "ordinary" Rh antibodies (agglutinins) are bivalent, while the more recently discovered Rh antibodies (blocking antibodies or glutinins) are univalent (Figure 1). Based on this concept, it seemed reasonable to conclude that the Rh-blocking antibodies are composed of smaller molecules and therefore more readily capable of traversing the placental barrier. Actual tests did show that univalent antibodies freely pass through the intact placenta which, however, effectively holds back

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†This study was carried out in collaboration with Dr. I. B. Wexler, as described in detail in previous reports. The author also wishes to acknowledge the assistance of Mrs. E. B. Gordon, Mrs. L. Katz, and Mrs. C. Mazzarino in the performance of the serological tests essential for the diagonsis of the disease.

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ALEXANDER S. WIENER

agglutinins (bivalent antibodies).[10,11] Thus, it became clear that it was the Rh-blocking antibodies which produced the disease in the fetus, not the Rh agglutinins as originally postulated by Levine. In cases where the mother is Rh-positive, univalent antibodies of other specificities, such as A, B, and Hr can give rise to the disease.[12]

One would expect the stillbirth rate due to Rh sensitization to be correlated with the titer of Rh-blocking antibodies in the maternal serum, and such indeed proved to be the case.[13,14] It was found, however, that in many typical cases of erythroblastosis, Rh antibodies were not demonstrable in the Rh-negative mother's serum by the blocking test as well as the agglutination test. We now know that the blocking test, being an indirect test, is not sufficiently sensitive to detect *weak* univalent antibodies.

Diamond and Abelson[15] then developed a slide test for Rh sensitization but were unable to explain its mechanism. Wiener[6] developed a direct test for univalent antibodies, the conglutination test, based on the principle that normal plasma contains a substance, conglutinin, an aggregate of serum proteins related to complement, which is adsorbed by red cells which have been sensitized by univalent antibodies, and causes them to stick together. This, Wiener pointed out, was the probable mechanism also of Diamond and Abelson's slide test. Clumping due to conglutination is similar to that due to agglutination, but the mechanisms are different as follows:

Rh-positive red cells
+
Rh agglutinin (bivalent antibodies)
↓
Agglutination

Rh-positive red cells
+
Rh glutinin (or blocker) (univalent antibodies)
+
Conglutinin → Conglutination

Since the Rh antibodies are gamma globulins, red cells coated with univalent antibodies can be made to clump with antisera from rabbits immunized with human serum. This method of detecting red cell and bacterial antibodies was first applied by Moreschi[16] as early as 1908, and has recently been introduced for detecting Rh sensitization by Coombs, Mourant, and Race.[17] However, the test gives the same results as the far simpler conglutination test, and it is so elaborate and time-consuming that it is not practicable for routine work. Moreover, in extensive comparative tests we have found the conglutination test to have fewer pitfalls and to give more consistent results than the antiglobulin test.[18,19]

With the aid of the conglutination test, we have studied the effect of maternal Rh antibody titer on the incidence of stillbirths among Rh-positive fetuses. (Of course, Rh-negative fetuses will not be harmed by maternal Rh antibodies, and the resulting newborn babies will not be erythroblastotic.) As shown in Table 1, among 120 Rh-positive infants from nonsensitized Rh-negative mothers, there were only 3 stillbirths, or 2.5 per cent. Thus, if the Rh-negative mother is not sensitized she is no more apt to have a stillbirth than the average Rh-positive mother. On the other hand, when the Rh-negative mother is sensitized, there is a considerably higher chance of a stillbirth occurring in proportion to the Rh antibody titer, reaching as high as 54.5 per cent. Naturally only

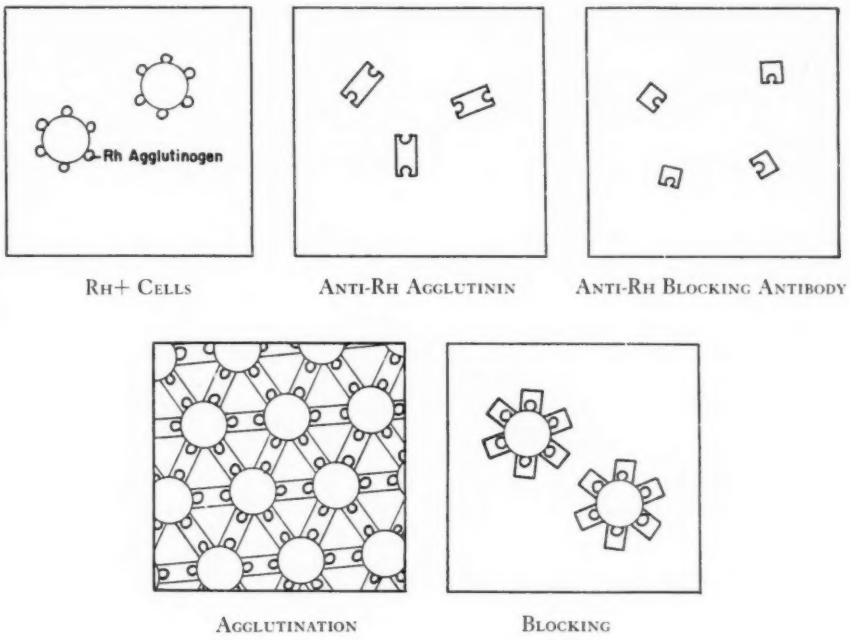


FIGURE 1. Diagrammatic representation of Rh agglutination and blocking reactions.

those erythroblastotic babies who are born alive can be treated. However, our experience has shown that in some cases where a stillbirth would otherwise have been inevitable, the baby can be saved if delivered prematurely and treated at once by exchange transfusion. Of course, this procedure cannot be applied when the stillbirth occurs very early before the fetus reaches the period of viability.

Erythroblastotic babies born alive have "coated" red cells, because the univalent antibodies passively acquired in utero attach themselves to the red cells in vivo.[6,18] Coating of the fetus' red cells by univalent antibodies per se is relatively harmless. Many cases have been observed in which infants have been born with coated red cells, and yet did not become ill even though such coating was demonstrable for periods of as long as four to six weeks.[20,21] However, the specifically sensitized red cells can adsorb complement, conglutinin, or both, in vivo, with resulting intravascular lysis or clumping of the red cells.[22] Complement and conglutinin, unlike the univalent antibodies, are not passively acquired from the mother, but must be formed by the fetus or infant himself. In utero, conglutinin and complement are not fully developed, but the profound physiologic changes occurring at birth cause these substances to mature rapidly, though not to the adult level.[23,24] This accounts for the observation that the process of birth itself, whether spontaneous at term or induced prematurely, appears to aggravate the disease. Many erythroblastotic babies seem quite normal at birth, but within a few hours or days develop jaundice and anemia, and die within a few days with the postmortem finding of nuclear jaundice.

Since complement and conglutinin are defec-

TABLE 1

Frequency of Stillbirths Among Rh-Positive Infants in Relation to Maternal Rh Antibody Titer

Maternal Rh antibody titer	Number of Rh-positive babies	Stillbirths	
		Number	Per cent
0	120	3	2.5
−4	18	3	16.7
−16	31	4	12.9
−64	36	11	30.6
Above 64	11	6	54.5

tive in utero, it becomes necessary to explain the occurrence of stillbirths. The amount of complement and conglutinin needed to lyse or clump cells is inversely proportional to the degree of sensitization of the red cells.[24] Thus, if the maternal antibody titer is high, the fetal red cells quickly become completely coated, so that only minimal amounts of complement and conglutinin are necessary to complete the in vivo reaction.

In erythroblastotic babies born alive, the severity of the disease depends not only on the maternal antibody titer but also on the conglutinin and complement content of the baby's plasma. This is the reason why the correlation between maternal antibody titer and severity of the manifestation is not perfect. The occurrence of exceptional cases where erythroblastotic babies have recovered despite a high maternal antibody titer, or where a stillbirth has resulted despite a low titer, has caused some workers to conclude incorrectly that titer is therefore of no importance. Actually this merely shows that while the maternal Rh antibodies are the *primary* cause of the disease, they are not the *only* factor determining the outcome. In fact, treatment by exchange transfusion has completely changed the prognosis of the disease, as will be shown.

In erythroblastotic babies born alive, the manifestations may take either of two principal forms. In some cases the predominant picture is that of a progressive hemolytic anemia which usually responds to simple transfusion therapy, but the majority of cases exhibit a rapidly deepening jaundice (icterus gravis) often fatal within two or three days. The hemolytic variety of the disease is due to intravascular lysis, while icterus gravis presumably results from intravascular clumping with blockage of the circulation to vital organs such as the brain and liver.[22]

While simple transfusions can counteract hemolytic anemia, they obviously cannot correct or prevent intravascular clumping.[25,26] Accordingly, it is in icterus gravis that exchange transfusion has proved its life-saving ability most dramatically.[27,28] Even in the less lethal cases of hemolytic anemia, exchange transfusion has the advantage of greater efficiency. A single exchange transfusion takes the place of multiple smaller transfusions, and the baby leaves the hospital with his mother instead of remaining behind for weeks or months as was formerly the case.

If intravascular clumping affects only a few small vessels in the brain, the infant may survive only to be left a mental and physical wreck. Neurologic sequelae, characterized by athetosis, mental retardation, blindness, deafness, ataxia, rigidity, spasticity, and emotional instability occur with disturbing frequency following simple transfusion therapy, even when the original manifestations appear to be mild. As will be shown, exchange transfusion not only increases the survival rate from erythroblastosis but also prevents the occurrence of neurologic sequelae.[29]

In summary, therefore, the purpose and rationale of exchange transfusion is to remove the erythroblastotic baby's coated red cells before there has been time for intravascular clumping to occur. Obviously, it is necessary to replace the baby's cells by other cells which cannot be clumped by residual maternal antibodies in the baby's body. The antibodies per se are harmless so long as there are no red cells with which they can combine; untreated erythroblastosis produces its most harmful effect through vascular injuries sustained as a result of intravascular clumping blocking circulation to vital organs.

RESULTS

In Table 2, the results of treatment of 78 erythroblastotic babies (due to Rh sensitization) by exchange transfusion are compared with the results achieved when multiple simple transfusions were given. The uncorrected mortality rate among the erythroblastotic babies treated by exchange transfusion was 15.4 per cent; in

TABLE 2

MORTALITY RATE AMONG ERYTHROBLASTOTIC INFANTS TREATED BY SIMPLE TRANSFUSION IN COMPARISON WITH THOSE TREATED BY EXCHANGE TRANSFUSION*

SOURCE OF MATERIAL	TRANSFUSION	NUMBER OF CHILDREN TREATED	NUMBER DIED	MORTALITY RATE, PER CENT
Author's series	Exchange transfusion	78	12	15.4
	Simple transfusion	24	17	70.8
Cases treated at Jewish Hospital, 1945 to 1947	Simple transfusion	19	6	31.6

*Includes cases of Rh sensitization only.

TABLE 3

NEUROLOGIC SEQUELAE AMONG ERYTHROBLASTOTIC INFANTS TREATED BY EXCHANGE TRANSFUSION, AS COMPARED WITH THOSE RECEIVING SIMPLE TRANSFUSION

METHOD OF TREATMENT	TOTAL NUMBER OF CASES	NUMBER WITH NEUROLOGIC SEQUELAE	FREQUENCY OF NEUROLOGIC SEQUELAE, PER CENT
Exchange transfusion* (Author's series)	30	0	0.0
Simple transfusion (Author's series)	25	4	16.0
Simple transfusion (Zuelzer)	25	8	32.0

*Includes only cases followed for eighteen months or longer.

contrast to this, of 24 erythroblastotic babies previously born in a number of these families as many as 17, or 70.8 per cent, died. Moreover, of 19 erythroblastotic infants (cases of Rh sensitization) treated at the Jewish Hospital of Brooklyn before exchange transfusion was introduced, 6 or 31.6 per cent died. The latter figure underestimates the true mortality rate, because cases of icterus gravis that died without developing anemia and which, therefore, were not transfused are not included. Obviously, exchange transfusion has measured up to expectations in reducing the mortality rate in erythroblastosis.

It would hardly constitute a victory if the babies saved by exchange transfusion proved to be defective mentally or physically. As already pointed out, one would expect the treatment not only to save lives but also to prevent neurologic sequelae. As shown in Table 3, among erythroblastotic babies who survive following simple transfusion therapy as many as 15 to 30 per cent subsequently exhibit neurologic sequelae; in contrast, all our 66 erythroblastotic babies who recovered after exchange transfusion have developed perfectly normally physically and mentally. Thirty of our patients have now been followed for at least eighteen months, and the results have been especially gratifying in these cases. There is no doubt, therefore, that the early treatment of erythroblastotic infants by exchange transfusion, besides markedly reducing the mortality rate, effectively prevents the subsequent appearance of neurologic sequelae.

In order to ascertain whether there are other controllable factors influencing the mortality rate when erythroblastosis is treated by exchange transfusion, the cases have been classified according to the method of delivery in Table 4. The cases have also been classified according to maternal Rh antibody titer and, as expected, the results show that the mortality rate is influenced by the titer. However, the method of delivery seems to be a much more important factor. Thus, while the overall mortality rate among our 82 erythroblastotic babies was 15.9 per cent, among 16 babies delivered by cesarean section as many as 8 or 50 per cent died. On the other hand, among 66 babies born spontaneously or delivered prematurely by medical induction only 5 or 7.6 per cent died.

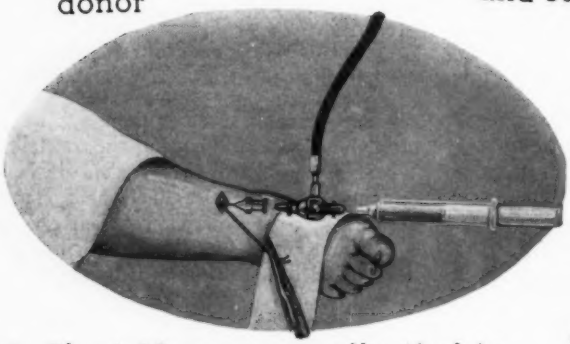
TABLE 4

CORRELATION BETWEEN MATERNAL RH ANTIBODY TITER, METHOD OF DELIVERY, AND RESULTS OF TREATMENT OF ERYTHROBLASTOTIC INFANTS BY EXCHANGE TRANSFUSION

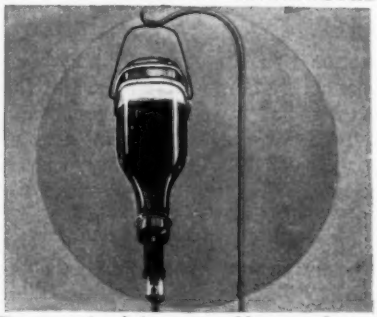
MATERNAL RH ANTIBODY TITER	ALL METHODS OF DELIVERY			DELIVERY BY CESAREAN SECTION			SPONTANEOUS DELIVERY, OR MEDICAL INDUCTION		
	NUMBER OF BABIES	MORTALITY RATE		NUMBER OF BABIES	MORTALITY RATE		NUMBER OF BABIES	MORTALITY RATE	
		NUMBER	PER CENT		NUMBER	PER CENT		NUMBER	PER CENT
−2	12	1	8.5	2	0	0	10	1	10.0
−4	5	1	20.0				5	1	20.0
−8	8	1	12.5	1	1	100.0	7	0	0
−16	10	0	0	3	0	0	7	0	0
−32	18	1	5.6	3	1	33.3	15	0	0
−64	18	5	27.8	4	3	75.0	14	2	14.3
Above 64	7	3	42.8	2	2	100.0	5	1	20.0
A-B sensitization	4	1	25.0	1	1	100.0	3	0	0
TOTALS	82	13	15.9	16	8	50.0	66	5	7.6

1. Drawing blood from donor

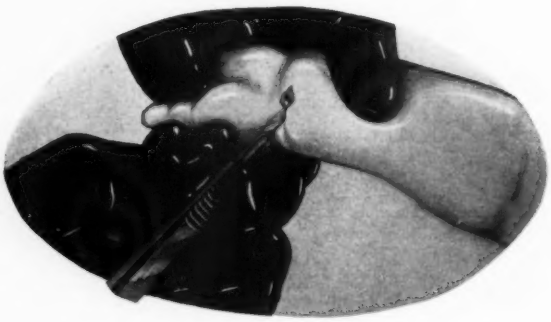
2. Exposing saphenous vein anterior and superior to medial malleolus



3. Blunt 20 gauge needle tied in vein; 0.2 cc Heparin injected



4. Donor's blood allowed to flow thru 3-way stopcock into vein

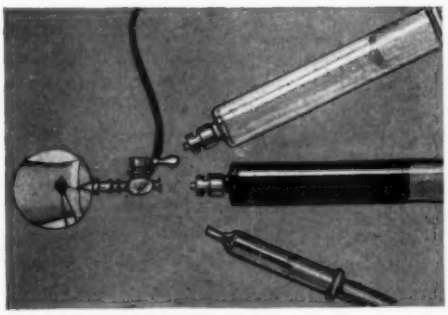


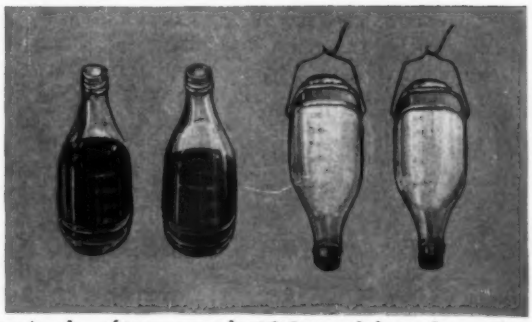
5. Radial artery exposed over head of radius

6. Blood permitted to flow by making V-shaped incision into artery

(A movie showing the technic of exchange transfusion is available for loan to medical societies.)

7. Exchange transfusion in progress





8. 1 cc. 10% Ca Gluconate injected after each 100 cc. blood and flushed thru with blood 2nd and final dose Heparin (0.2 cc) given at 250 cc. mark

9. (above right) Procedure terminated when 1000 cc. blood have been injected and 900 cc. withdrawn

10. Radial artery doubly ligated and skin sutured. No ligature necessary for vein

11. Postoperative care: 20,000 units Penicillin q.3 h. for 48 hours. Subsequent development is normal

TABLE 5

COMPARISON OF MORTALITY RATE IN ERYTHROBLASTOTIC INFANTS FOLLOWING "SINGLE" AND "DOUBLE" EXCHANGE TRANSFUSIONS*

METHOD OF TREATMENT	TOTALS	MORTALITY	
		NUMBER	PER CENT
Single exchange	33	6	18.2
Double exchange	41	6	14.6
TOTALS	74	12	16.2

*By "single" exchange transfusion is meant the exchange of 2 blood volumes (about 500 cc.) or less; "double" exchange entails the use of 4 blood volumes (1000 cc.).

The babies delivered by cesarean section who died usually exhibited low vitality at birth, and required continuous oxygen therapy throughout the transfusion, in contrast to the other babies who appeared strong and had a lusty cry. Death occurred as a rule only a few hours after the transfusion and at autopsy the most significant findings were in the lungs which on section appeared atelectatic and hemorrhagic; some of these cases also showed cerebral hemorrhage. This suggests that during cesarean delivery, the babies may aspirate blood or amniotic fluid which interferes with respiration. In any event it is clear that when erythroblastotic babies must be delivered prematurely, this should be accomplished by medical induction rather than cesarean section, unless there is a maternal indication for operative delivery.

More recently, we have been using 1000 cc. of fresh citrated blood for exchange transfusions instead of 500 cc. as was originally done.[30] However, the comparative results presented in Table 5 indicate that our results have not been improved significantly by the larger volume of blood. In one case involving a pair of erythroblastotic identical twins, 500 cc. of blood were used for one twin and 1000 cc. for the other. Both twins recovered promptly and completely, the only difference being that the jaundice was slightly deeper and took a short time longer to clear in the twin who received the smaller volume of blood. Despite these results, there are theoretical advantages to the use of 1000 cc. of blood instead of 500 cc., and it is intended to continue these comparative studies for the time being.

While the difference in results between 1000 cc. and 500 cc. blood exchanges is not striking, the difference between doing an exchange and more conservative treatment is impressive. In one of our cases, an Rh-negative multipara with a homozygous Rh-positive husband was found to have Rh antibodies in her serum antenatally. Labor was induced, and a pair of identical male twins was delivered about four weeks before term. The twins appeared normal, their blood counts were within normal limits, and the icterus index of the cord sera only 20 units (by the acetone method), so that the obstetrician and family felt no treatment was indicated. We prevailed upon the family to permit us to perform an 1000 cc. exchange transfusion on the twin who had a slightly lower blood count. For a period of about thirty-six hours, the progress and hematologic findings of both twins were indistinguishable; then the untreated twin became jaundiced and the jaundice rapidly deepened so that within twelve hours the icterus index reached 120 units. An exchange transfusion was undertaken, but unfortunately the jaundiced twin died during the procedure when only about 200 cc. of blood had been transfused. The twin treated promptly after birth is progressing normally.

In order to determine whether the sex of the patient has any influence on the prognosis, our cases have also been analyzed from that point of view. The results show that sex had no significant effect on either the incidence or the mortality rate of the disease.

COMMENT

It is clear that the Rh type of an individual, whether Rh positive or Rh negative, has no influence on one's health; that is, the antigens per se are harmless. Also whether an Rh-negative individual is sensitized or not has no effect on his health—the antibodies per se are harmless. Only when the Rh antigen and its specific antibody are present in the same body does harm result—viz., in erythroblastosis fetalis, or in sensitized Rh-negative individuals transfused with Rh-positive blood. The harmful effect results through the blood stream, namely, as a result of intravascular lysis or clumping.

To treat erythroblastosis, it is therefore necessary to remove either the maternal antibodies or the antigen or both from the baby's body. Since the antibodies are largely already attached to the red cells and also permeate the body fluids as well as the blood serum it is obviously impracticable or impossible to attempt to remove the antibodies, so the only recourse is to remove

the baby's coated red cells and replace them by cells incapable of reacting with the maternal antibodies. As shown in this paper, the simplest and surest method of accomplishing this objective is by exchange transfusion.

A certain degree of success also can be attained by multiple small transfusions of whole Rh-negative blood, or better by transfusion of packed compatible red cells. When cases treated in this manner recover, the mechanism is similar to that of exchange transfusion. The only difference is that instead of the baby's own cells being removed from his body, they are hemolyzed, and then replaced by transfusion. Obviously, to rely on hemolysis to dispose of the baby's red cells is not as safe—during the process of hemolysis some intravascular clumping may occur which, if it does not cause the baby's death, may give rise to sequelae of brain damage later on. Even if intravascular clumping does not occur, the disposal of hemolyzed red cells places a heavy burden on the reticuloendothelial system, and recovery is much more protracted.

A case reported by Wiener and Hyman[31] is particularly instructive. An erythroblastotic baby had been treated by multiple small transfusions of blood not typed for the Rh factor. At the age of one month, when survival was already assured, the baby was given intramuscular injections of maternal serum followed by a transfusion of blood from the father. A hemolytic reaction resulted and the baby died. In another case seen more recently, an erythroblastotic baby was treated by transfusions of maternal blood and survived; there were no untoward reactions following these transfusions.

Although all workers agree that transfusions of maternal blood are contraindicated, these experiences showed that the introduction of additional Rh antibodies into the baby's body need not aggravate the disease, provided that Rh-positive cells are not introduced at the same time; the second baby recovered by virtue of the Rh-negative cells received from the mother. Obviously, this method of treatment, though apparently successful in the case cited here, is even more unsafe and uncertain than the use of multiple transfusions of Rh-negative blood. The safest and surest method available at the present time for treating erythroblastosis is exchange transfusion.

SUMMARY

The results of treatment of 82 cases of erythroblastosis fetalis by exchange transfusion have been summarized.

The overall mortality was only 15 per cent, in contrast to a mortality rate of 30 to 75 per cent following more conservative treatment. All the babies who survived after exchange transfusion have developed normally both mentally and physically, while neurologic sequelae occur in 10 to 30 per cent of erythroblastotic babies surviving after more conservative treatment. Thus, therapy by exchange transfusion not only saves erythroblastotic babies who would otherwise die, but also prevents the occurrence of neurologic sequelae.

The method of delivery of an erythroblastotic baby has a pronounced effect on the prognosis. Among 16 babies delivered by cesarean section as many as 8, or 50 per cent, died, while only 5 out of 66 babies born spontaneously or delivered prematurely by medical induction died. Thus, if cesarean section is avoided, the mortality of the disease in erythroblastotic babies born alive and treated by exchange transfusion can be reduced below 10 per cent.

The maternal antibody titer is important, because the higher the titer, the more apt is the Rh-positive fetus to be stillborn. Obviously, only babies born alive can be treated. In cases where the stillbirth does not occur too early, before the period of viability is reached, babies who would otherwise be stillborn can be saved by terminating the pregnancy prematurely by medical induction (*not cesarean operation*, unless a maternal indication is present) and treating the baby without delay by exchange transfusion.

The sex of the fetus has no apparent influence on the incidence of erythroblastosis fetalis or its prognosis.

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Hearing Aids

PROCEDURES FOR TESTING AND SELECTION

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Clinical efforts to measure hearing loss effectively, to evaluate hearing disability, to conserve and retrain residual hearing, and to mitigate the handicap of hearing loss have only recently come to assume major proportions. These are the objectives of a relatively recently recognized field of knowledge that is called audiology.

Audiology is the science of hearing, and the audiologist may be either a researcher or a clinician or both; his field is concerned with every aspect of knowledge and behavior that may have significance in appraising and treating the person with impaired hearing. This is a cooperative effort, involving the services of both medical and nonmedical specialists, the effectiveness of which has been well demonstrated in the service centers for hearing rehabilitation in World War II, where many thousands of cases of hearing disability were handled.

Since the war many new developments have occurred, in instrumentation, in surgery, in research, and in clinical audiologic technics—applicable to the problems both of children and adults—so that the great proportion of those with impaired hearing may be brought back into the world of communication with all that this implies in terms of behavior, personality, and economic self-sufficiency.

Nobody knows exactly how many persons with impaired hearing there are in the country. An analysis conducted by the American Hearing Society in 1945 produced the following estimates: (1) there are between 10 and 15 million persons who are hard of hearing in one or both ears; (2) there are between 5 and 8 million persons with serious acoustic handicaps; (3) approximately 600,000 hearing aids have been put to use; (4) between 3 and 4 million persons need hearing aids; (5) there are more than 1 million children with impaired hearing in the public schools.

Awareness of these problems is not new. For many years a few otologists, a group of special educators, some engineers and physicists, and a few humanitarian laymen have devoted time and interest to the problems of hearing impairment. Within the past eight to ten years, however, advancements in diagnostic technics, in medical therapy and surgical procedures, in electronic design and in audiologic methods of communicative retraining, have constituted a really tremendous development in the field.

Fundamental to modern methods of clinical audiology are two facts that have been drawn from the experience of recent years: (1) that the great majority of persons with hearing impairment, both children and adults, possess some useful amount of residual hearing; (2) that, with the use of suitable amplification, carefully selected for the individual's needs and with basic training in the use of this amplification incorporated into daily habits, the individual with impaired hearing can usually learn to compensate reasonably well for his disability. (The mitigation of hearing impairment in suitable cases by surgical procedures is thoroughly described in the literature, and lies outside the scope of the present discussion.)

The key to the present rapid progress in clinical audiology is, without question, the advancements made in recent years in the design and construction of hearing aids. Not until the perfection of the midget vacuum-tube did a wearable hearing aid offer genuine satisfaction. Even the best of hearing aids is no panacea, of course, but the best of them now are precision instruments, light in weight, durable, relatively free from electronic distortion, and reasonably comfortable to wear.

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A hearing aid is a device to make sound louder. Cupping the hand against the ear will increase the sensation of loudness by 8 to 10 decibels, an appreciable gain that in some instances makes the difference between hearing or not hearing a sermon or a speech in a large auditorium. For many cases of marginal perceptive impairment or of moderate presbycusis ("old-age deafness"), an ear-trumpet is an ideal device; it supplies considerable loudness without too much distortion. It has few cosmetic virtues, however, and in our day requires the personality-bent of a "Lum and Abner" for ready adaptation. The carbon-type hearing aid goes a step further in supplying additional sound energy, but unfortunately cannot supply enough energy to provide satisfaction for the great proportion of persons with impaired hearing. The modern vacuum-tube hearing aid, on the other hand, can supply all the energy that the ear or the person can tolerate.

The modern vacuum-tube hearing aid is quite similar in construction to a public address system. It consists of a transmitter, a receiver, and a set of batteries to supply power. The transmitter includes a microphone, an amplifier containing a circuit with two or more midget vacuum-tubes, a variety of condensers and resistors, an on-off switch, a volume control, and often a tone selector. If an air-conduction aid is used, a fitted earpiece must be worn in the external auditory canal. If a bone-conduction aid is worn, the receiver, or oscillator, must be held firmly in place in the region of the mastoidal promontory by a headband. Both types of aids are powered by an "A" battery of 1½ volts and a "B" battery which may vary from 22½ to 45 volts according to the type of aid and the needs of the individual. In most of the newer models, midget batteries are employed, and both transmitter and batteries are enclosed in a single case.

Hearing aid manufacturers achieve the electronic results they desire by building up the circuits in different ways. The newer designs incorporate variable responses which may be selected by means of tone and volume controls. It is in terms of these characteristic responses that the manufacturer incorporates the performance that typifies any make or model.

The characteristics of the receiver, too, modify the performance of an aid; therefore, the receiver must be considered an integral part of the instrument. Bone-conduction receivers are inherently less efficient than the air-conduction type, both in the amount of amplification and in the range of frequencies they reproduce.

A SATISFACTORY hearing aid should meet certain basic requirements, such as those outlined by the Office of Scientific Research and Development. These are: (1) *sufficient power* to bring audible sounds to the impaired mechanism; (2) *tolerability*—that is, audible and, if possible, intelligible, sounds must be brought to the ear without causing pain, tickle, or serious discomfort; (3) *fidelity*—within reason, other things being considered, the aid should amplify normal speech without distortion, so far as the factors causing distortion may be properties of the aid; (4) *wearability*—the earpiece, or headband, and the instrument must be wearable without undue discomfort, and (5) *sufficient sensitivity and amplification*—it is desirable that the aid be able to make intelligible to the wearer ordinary speech at conversational loudness.

For maximal benefit from air-conduction instruments, a properly fitting, individually molded earpiece is an essential. Moreover, this earpiece must be used in the process of selecting an aid, that is, in selecting the right aid for the individual. Earmolds are now made of acrylic materials, the impression preferably being made with a semiplasticized substance that need not be finally processed until seventy-two to ninety-six hours after the impression is taken. Thus, it is quite possible for the otologist or the audiologist to take the impression and then send it to a properly equipped laboratory for preparation of the finished product.

There are many makes and models of hearing aids marketed today. Only those aids should be recommended which satisfy the standards set up by the Committee of Consultants on Audiometers and Hearing Aids of the Council on Physical Medicine of the American Medical Association. With this restriction the potential user is assured reasonable satisfaction of the standards outlined, so far as these elements may be determined by careful, impartial laboratory tests. Reputable manufacturers are endeavoring to design their instruments with as many improvements as are feasible, and details of performance, weight, size, flexibility, and of economic upkeep are consistently improving.

By and large, among persons with hearing impairment that interferes with normal communication and behavior, there are two major

types of problems. First, there is the individual *A* who belongs in the "louder please" category. His problem is caused by a conductive lesion, whereby the passage of sound from the external ear through the middle ear is interfered with. He may have a severe impairment, so that a very loud voice, close by, is necessary to reach him. The point is that, given sufficient sound energy, *A* both hears and understands. Very often he reports that he gets along well in conversation in a noisy environment; for the racket of a reception or a party that makes the normal hearing persons raise their voices in order to converse is much diminished for *A*, and he thoroughly enjoys the loud conversation which comes to him clearly. *A* is the ideal hearing aid wearer and should get much satisfaction from a hearing aid that suits his needs.

Second, there is the individual *B* who belongs in the "I can't understand you" category. Although he may need increased loudness in all frequencies through the speech-hearing range (roughly 300 to 3500 cycles per second), loudness alone is not the primary point. He needs clarity. His problem is caused by perceptive impairment, whereby the function of the sensory cells of the inner ear, or of the eighth nerve tract above the cochlea, has been impaired. The acuity of perception for high tones is always more affected. The net result is auditory distortion, to a degree that interferes with the ready understanding of speech and other sound entities.

It is unwise to generalize the problems of perceptive impairment so far as the use of a hearing aid is concerned; without question the use of amplification is indicated in many, perhaps the greater proportion of, cases, and with careful precaution in the selection of a hearing aid and with audiologic training, the individual may be greatly benefited. Many cases of perceptive impairment provide difficult problems, however, both in otic performance and in psychologic adjustment, and such problems should be handled by those who are capable of apprehending and comprehending them. Usually it is unwise simply to advise a person with severe auditory distortion from perceptive impairment to "go get a hearing aid." He may be able to use one, probably can, but will require considerable clinical audiologic work in terms of selection and training.

A third category, typified by an individual *C* who has a mixed-type impairment, has various attributes of the first two. The needs must be determined according to the history of the individual and behavior in communicative terms.

Still another type of impairment is often called central, to suggest that the lesion lies above or beyond the cochlea (the descriptive term "retro-labyrinthine" is sometimes used) in the midbrain or the cortex. A special form of this category involves aphasia or dysphasia in which the lesion is not otic in any sense but neurologic, whereby the trouble lies not in the perceptive but in the associative mechanism of symbolization.

Yet another type of impairment is psychogenic in whole or in part. In its purest form this is hysterical deafness, actually a fairly rare and fairly readily recognizable entity; in its commonest form this kind of impairment usually involves some otic trouble which is functionally aggravated by psychic factors.

By its very nature hearing impairment involves a great deal more than the condition of the ears. Hearing is not an end in itself, but a means to an end—in practical terms, the ready participation in conversational exchange. When one is faced with a permanent hearing impairment sufficient to interfere with normal social intercourse, the important points to be determined are the nature and extent of the communicative disorder. What these are depends in large part not only upon the history of the hearing loss but also upon the effect of it on the individual. It is well known that the problems of tinnitus and tolerance for sound, for instance, are in large measure aggravated by psychic components in the individual's makeup. So, too, with the entire psychosocial structure of the communicative disorder caused by hearing disability.

There is not space here to discuss even the directions of current research into problems of personality and behavior related to hearing impairment; but it is wise to underscore the observation that otic pathology and resultant hearing impairment are inevitably psychosomatic problems. That this is so is simply a restatement of the fact that hearing—good, bad, or indifferent—is part of the essence of our use of language, which is, in turn, the aspect of humanity that makes us most human.

SINCE the war, and following in a pattern largely determined by wartime experience, there have come into being a few audiologic

clinics that are part of the otolaryngologic services of major medical centers. Here are conducted extensive research programs, usually with some view to clinical application, and here are handled large case-loads. In broad terms, such an audiologic center offers extensive services in diagnostic testing of both children and adults, and in rehabilitation or training of the affected individual, so far as this is clinically feasible.

An audiologic center does not exist simply to select hearing aids for persons who need them; this process constitutes no more than one-fifth of the use of time and personnel. For, important as is the selection of a hearing aid for the cases that constitute serious audiologic problems, it is only one step in a complex set of procedures. For persons like *A*, in the "louder please" category, the selection of a suitable hearing aid is usually not difficult; he will obtain good results from several of the current models of aids and a particular selection is largely a matter of detail in refinement of hearing, wearability, size, service, price, and the like. This is not to say that the use of a hearing aid is a categorical answer to his communicative needs; whether or not this is true depends upon what kind of a person he is, and what his habits and attitudes, communicative and otherwise, have become. Any hearing aid wearer is going to have some problems of adjustment.

Persons like *B*, who hear but cannot understand, constitute the greater proportion of the case-load of adults in an audiologic center. More important still, in terms both of case-load and time in the audiologic center, are the children with impaired hearing. Their number seems to be growing constantly, and it is largely for the alleviation of their problems that the work of clinical audiology needs to be developed further.

There are three essential steps in clinical audiology when a communicative disorder caused by hearing disability is presented: (1) a thorough appraisal of the person in audiologic, and sometimes in psychologic, terms; (2) careful screening and selective tests to determine the hearing aid of choice; and (3) suitable training to help him overcome the communicative disorder.

The first step is of major importance. It has two parts which are undertaken concurrently: (1) otologic examination and diagnosis, supported by a complete battery of functional tests; (2) a thorough appraisal of the individual's needs, according to the findings of the diagnostic tests and his communicative behavior. In most instances, audiologic work is not begun until all indicated otologic procedures have been carried out. Where there is a conductive lesion, there may be a variety of medical and/or surgical procedures available to mitigate or even remedy the hearing loss. There is no such possibility for mitigation with a perceptive lesion; although various attempts are being made, there seems to be no clear evidence that perceptive impairment can be reversed.

For some fifteen years the pure-tone, or discrete frequency, audiometric test has been standard; more recently, speech audiometry has been standardized. It is necessary to have the information gained from both of these tests. Those persons with a hearing loss of 30 decibels or more in the better ear through the range of conversational frequencies, and with a comparable loss for speech reception, are usually considered potential hearing aid wearers.

Speech audiometry involves various measurements: (1) the threshold of intelligibility; (2) discrimination at supra-threshold levels; (3) tolerance for loud sound; (4) ability to discriminate language in the presence of noise. All these tests consist of presenting speech signals, in words or short sentences, at controlled intensities.

The tests must be administered in soundproofed, acoustically controlled surroundings, and require special equipment, as, indeed, does any accurate speech-hearing test. The tester, seated in the control room, speaks into a microphone, monitoring the intensity of his voice by a meter connected with a preamplifier (or the signals may be reproduced from a phonograph); by means of an attenuator, the output intensity through the main amplifier to the test room can be set at any level within the range of the amplifier. The patient sits in the test room with his head at a measured distance from the loudspeaker which brings him the sound, and he responds by repeating aloud or writing down what he hears.

In measuring speech-reception threshold, the tester attenuates the intensity until the level is reached at which the patient correctly identifies 50 per cent of the test words. Tolerance testing is usually done with short sentences, increased in intensity until the patient feels discomfort.

Most important, perhaps, so far as the use of a hearing aid is concerned, is the speech discrimination test. For this, the output is raised at least 35 decibels above the previously determined threshold, and lists of phonetically-balanced test words are employed to determine the individual's ability to discriminate fine differences in speech-sounds. Most of the energy in speech lies in the frequency range up to 1000 cycles per second; ability to discriminate—in short, to *understand*—is centered in the range above 1000 cycles. As Fletcher demonstrated many years ago, when the frequency-range above 1000 cycles is filtered out, the person with normal hearing loses 35 per cent of his ability to discriminate speech sounds. A person with a pure conductive-type impairment should maintain excellent discrimination at an output level 35 decibels above threshold. A person with perceptive impairment, on the other hand, usually suffers a considerable loss in discrimination; and when this loss is of the order of 60 to 70 per cent, or more, one may be assured that a hearing aid will be of little value. Unfortunately, this is often true in cases of presbycusis, but is by no means limited to such cases. Perhaps it need not be emphasized that these data of auditory function in discrimination cannot be determined by studying a pure-tone audiogram.

The typical correlations between pure-tone audiometry and speech audiometry are known. When there is lack of agreement and consistency between the findings for pure-tone audiometry and speech audiometry, one looks for complicating factors in the case, and special tests or referrals are indicated. It cannot be said too often that neither pure-tone audiometry nor speech audiometry, by itself, is a sufficient measure of the patient's hearing responses. The two tests are truly complementary.

PURE-TONE audiometry is of great diagnostic value, both in determining type of hearing loss and in evaluating the necessary power of a hearing aid; it presents a pattern of the residual hearing at threshold, usually across a span of six octaves. Speech audiometry, on the other hand, tells us what a patient does with his hearing in responding to normal conversational sounds. The use of a hearing aid is primarily concerned with conversational situations, and we must know the individual's capabilities of interpreting normal language before we can predict how much benefit he may derive from a particular hearing aid. Incidentally, speech audiometry is useful in pointing up complicating factors involving the central nervous system; considerable data indicative of either pathologic or psychogenic complications have been obtained by retest comparisons between pure-tone and speech audiometry.

Parenthetically, it is worth observing that, in audiologic terms, the traditional conversational voice test is at best a rough screening procedure, and is of little value for objective appraisal because it cannot be standardized. The whispered voice test is perhaps more useful, but its accuracy is limited to observations of high-tone hearing loss. Little needs to be said about the coin-click and watch-tick tests. They are convenient, but unless the test technic is uniform and the coin or watch employed be standardized, no accurate measurement of the individual's hearing is possible. Examination by tuning forks—typically the Rinne, the Schwabach, and the Weber tests—is most useful as an aid in differential diagnosis.

Once it has been determined by medical and audiologic examination that a hearing aid is indicated in a particular case, an impression for an earpiece is made and preliminary steps in selecting an aid are taken. Experience substantiates the choice of an air-conduction instrument whenever possible. A contraindication would be an acute or chronic suppurative condition of the middle ear, or an extremely low tolerance threshold for loud sounds, such as is often encountered in deafness of long duration. This last condition can be adequately determined, however, only in the selection situation.

The goal is to find the aid that gives the patient the greatest benefit in power and in discrimination, as demonstrated under controlled conditions in quiet and in noise, and that is most acceptable to him from every other point of view. The objectives to be achieved are the five points mentioned previously: (1) adequate amplification, (2) within the limits of tolerance, (3) reproduced with fidelity, (4) with enough sensitivity to promote ready discrimination, (5) all incorporated into a convenient, wearable instrument.

Particular attention must be paid to problems of tolerance and sensitivity in cases involving perceptive impairment. No patient is going to labor to adjust to a hearing aid unless he is fully satisfied as to its possibilities, and merely "hang-

ing an aid" on an ear gives no assurance that the individual is going to continue to wear it. Pathologic ears vary in undetermined fashion, and the hearing response is always complicated by the listening habits, indeed, by every aspect of the individual's behavior. Accordingly, the psychology of the selecting process is exceedingly important, and due consideration must be given to subjective responses.

Generally speaking, persons with a speech reception loss of from 40 to 70 decibels make the best use of a hearing aid. On the other hand, successful adjustments have been made by persons whose loss ranges between 30 to 40 decibels. Indeed, every audiologist knows patients in the 30-decibel-loss group who are considerably more impaired, behaviorally speaking, than others in the 45-decibel-loss group. At the other end of the scale, patients with speech reception losses ranging from 80 to 100 decibels, profoundly impaired, have made good use of hearing aids. They do not gain balanced intelligibility from normal conversational sounds, of course—some of them not even clear audibility—but they can often hear vowel sounds and speech rhythms, and are made conscious of movement around them by vibrations picked up by the microphone. Frequently, this is enough on which to build a careful course of speech reading and auditory training in combination.

The culminating steps in the clinical process involve the instruction of the patient in the care and use of his aid, and in helping him to rebuild his hearing habits so that his behavior in communicative situations is at maximal efficiency. This is called auditory training. The basic audiologic tests and the process of selecting a hearing aid point up what must be done with the individual in training him to use his aid to the best advantage. At an audiologic center, these needs are incorporated into a regular course of training, modified to suit the needs of a particular patient. The objectives of the course are: (1) to condition the patient to amplified sound; (2) to instruct him in the care and use of his aid in various situations; (3) to present the foundation for an understanding of functional hearing; and (4) to consider problems relative to social and economic adjustment.

Although some of the training must be carried on in individual terms, there is considerable virtue in the group situation. This work was designed primarily for recently deafened adults. Those who have a hearing loss of long duration have usually suffered speech-hearing deterioration, and present special problems of auditory adjustment. So, too, with the child who wears a hearing aid at an early age; he has no stabilized pattern of communicative habits, and must be taught sound recognition step by step, day after day, until a normal vocabulary of phonetic values is built up. In short, the audiologist believes that experience in auditory training under expert guidance provides the essential answer to the serious problems of adjustment facing many persons with impaired hearing.

The problems and the audiologic methods employed are quite different with children. Much depends not only upon the extent of the child's impairment but also upon whether or not it precluded the acquisition of normal language habits. Obviously, the fundamental step is diagnosis, in the terms discussed previously. Within recent years, much effort has been concentrated upon the needs of the school-age child, both in case finding and in treatment, and, although few states have school health programs that are adequate to prevent hearing impairment and to conserve residual hearing, considerable progress is being made. Even more important, however, are the needs of the preschool-age child, for if he has hearing impairment in those years when both language learning and behavioral development are at their peak, he needs special help.

Within the past two years, special attention has been given to auditory testing of infants and children under 3 years of age and we can now make accurate audiometric measurements in this age group. This is objective audiometry, involving no active participation on the part of the child, wherein galvanic skin-resistance responses are elicited by means of a conditioned response to the test tones. When the use of amplification is indicated, it is begun at the age of 2 years, and is now being carried out with considerable success under careful guidance.

Questions are raised from time to time about the advocacy of amplification for persons with perceptive impairment. (Obviously, the point is not pertinent in instances of conductive lesions without perceptive involvement.) These questions are particularly pertinent in terms of industrial situations where there is a high noise level. It has already been emphasized that sensitivity of the hearing aid and tolerance for

sound of the wearer are important factors in the selection of hearing aids; the implication, of course, is that the possibility of further auditory trauma must always be considered in the audiologic process.

There is little doubt about the fact that affected ears are open to aggravation by further acoustic insult, but there is no evidence that a suitable hearing aid has ever brought this about. Actually, the perceptively impaired person will hear any very loud sounds, within the range of his residual hearing, almost as well as a person with normal hearing, and he will not tolerate amplification in very loud situations—in short, *if* he is wearing a hearing aid in such situations, he turns it down or off. As for supersonic effects, the evidence indicates that high frequency range makes no difference in acoustic insult; as usual, it is intensity that is important; and it is the less than supersonic frequencies at high intensity that cause the damage.

Much more important, in industrial medicine, than the question of hearing aids in intense sound levels, is the whole matter of prevention of impairment and of adequate otologic service. With the advent in production of jet propulsion and its derivatives, this has become an acute matter in certain quarters. Yet, in relatively few industrial establishments are tests of auditory acuity incorporated into the physical examination. Important as the problem is in modern airplane manufacture, where sound levels in excess of 150 decibels are routine, it is quite as urgent in a variety of other industries of lesser acoustic magnitude; actually, it would appear to be important wherever men and women work, for otic impairment remains high in the list of human disabilities.

SUMMARY

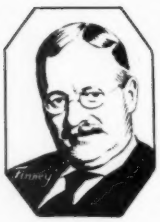
Recent audiologic developments indicate that the complex problems of hearing impairment, which take a heavy toll in terms of physical well-being and social adjustment, can be answered. Improvements in diagnostic technics, advancements in medical therapy and surgical procedures, developments in electronic instrumentation, new methods of audiologic training, and forward steps in the prevention of hearing loss and related behavioral maladjustment—all these developments within the past decade have added immeasurably to the armamentarium of the otolaryngologist, the pediatrician, the psychiatrist, and the general practitioner in helping to alleviate one of the major disabilities of humanity, a communicative disorder caused by hearing impairment.

We have learned that the great majority of persons with such disorders can be benefited, by medical and surgical treatment, by audiologic handling with a suitable hearing aid, or by both. The problems caused by conductive lesions are more amenable to treatment than are those caused by perceptive lesions. Many persons in the latter group cannot be benefited to a full extent without special audiologic work. For them, in particular, the determination of, and use of, a suitable hearing aid are apt to be complex processes that require expert appraisal and handling. We have learned that hearing rehabilitation involves much more than the condition of the ears; it is the person between the ears who needs help and readjustment.

These problems with regard to children are considerably more complex than with adults. Good progress has been made in the development of diagnostic technics for infants and young children, however, and it is expected that the next decade will bring many new developments in the prevention of impairment among children and in lessening the severity of the handicap by early treatment and training.

So far as has yet been demonstrated, the use of a suitable hearing aid neither improves nor injures the otic condition. It is not a panacea, however; it has no brains, feelings, or attitudes. These must continue to be supplied by the patient and by the physician in whose care the patient reposes his faith. To tell a patient to "go out and get a hearing aid" is scarcely adequate case-handling; the needs of a particular individual are determined by the nature of the physical problem and of the behavioral problems, and these are best met by interested and extensive professional follow-up.

Sometimes these problems are fairly easy to solve; sometimes they are extremely complex. The essential point is that a great deal can be done to solve all of them. Accordingly, it would appear to be the obligation of every person connected with medicine to see to it that the person with hearing impairment under his care has the opportunity to make full use of the modern knowledge, equipment, and skills that are available in mitigation of his handicap.



Surgery of the Bile Ducts

JAMES T. PRIESTLEY*

MAYO CLINIC, ROCHESTER

It might seem that surgery of the bile ducts has been discussed so frequently in the past that there is little need for further comment on this subject. However, not infrequently one sees a patient who requires a second operation on the bile ducts which might have been avoided if sufficient attention had been given to certain details at the time of the original operation. Because of this fact it may not be amiss to reemphasize certain fundamentals in surgery of the biliary tract.

Obviously, the surgical treatment of lesions of the bile ducts is a large subject which cannot be covered in detail in a brief discussion. Therefore at this time my remarks will be confined mainly to a consideration of choledocholithiasis and stricture of the common duct with brief comments concerning neoplastic lesions of the biliary tract and pancreas.

INDICATIONS FOR EXPLORATION OF THE COMMON DUCT AT THE TIME OF CHOLECYSTECTOMY

One of the first decisions which the surgeon must always make at the time when cholecystectomy is performed for cholelithiasis is whether the common duct should be explored. Obviously, a stone in the common duct which is overlooked at the time when cholecystectomy is performed may require a subsequent operation. Certain information that may be obtained prior to operation and certain findings at the time of operation are of value to the surgeon in making his decision regarding the advisability of exploring the common duct.

First, it is well to keep in mind the symptoms commonly caused by choledocholithiasis. While it is well known that the majority of patients who have a stone in the common duct experience a severe colicky type of pain in the upper part of the abdomen on one or more occasions, it is equally true that stones may be present in the common duct without causing pain. Trueman[1] found that pain was present in only 77 per cent and severe colic in only 63 per cent of a group of 219 patients who had choledocholithiasis.

In passing, one might add the corollary that not all patients who have obstruction of the common duct caused by carcinoma of the pancreas have painless jaundice, as at least one-half or more of these patients will experience some form of upper abdominal pain or distress. Just as pain is usually associated with choledocholithiasis, so is jaundice. However, in the review made by Trueman jaundice had been present in only 61 per cent of patients. Obviously, if the stone in the common duct causes no significant obstruction, there may well be no jaundice.

Chills and fever occur more frequently in the presence of choledocholithiasis than when the gallbladder alone contains stones. In Trueman's series chills and fever occurred in 36 per cent of patients. Colics which occur quite frequently,

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for example six or ten times in one day, are more commonly associated with choledocholithiasis than with cholecystolithiasis by itself.

Thus it is apparent that certain symptoms should create suspicion in the mind of the surgeon of the possibility of choledocholithiasis and help him to form a preoperative opinion regarding the advisability of exploring the common duct. It is equally true that the absence of these symptoms should not be interpreted as definite evidence that there are no stones in the common duct.

At the time of operation there are certain findings which definitely indicate the advisability of exploring the common duct and certain other findings which suggest this advisability. In general, it is always best to follow the rule that, when one is in doubt as to the presence of a common duct stone, the duct should be explored. Palpation of the extrahepatic biliary ducts may definitely reveal the presence of a calculus or make one suspicious of a calculus. Under either circumstance, of course, the duct should be explored. Failure to palpate a calculus in the duct, however, cannot be accepted as definite evidence that there is no stone present. Frequently, varying degrees of induration in the head of the pancreas will render palpation of the lower end of the common duct quite difficult or unsatisfactory.

If jaundice is present at the time of operation, exploration of the common duct is mandatory. If there are numerous small stones in the gallbladder, and especially if a stone is found in the cystic duct, the possibility exists that there are stones in the common duct. The finding of an enlarged cystic duct suggests that this enlargement has resulted from a stone which has passed through the cystic duct, and therefore exploration of the common duct is advisable. If the common duct is larger than normal it should be explored because this usually indicates that obstruction has been present whether or not there is jaundice at the time of operation. Actually, exploration of the common duct at the time of cholecystectomy increases the risk of operation little if any, and should be carried out if there is any doubt in the surgeon's mind regarding the presence of a common duct stone.

A recent review of records at the Mayo Clinic for a period of five years revealed the fact that the common duct was explored in 24 per cent of all cases in which cholecystectomy was performed for cholelithiasis. Stones were found in one-half of the cases in which the common duct was explored or in 12 per cent of the total in which cholecystectomy was done. Some surgeons may explore the common duct in a higher percentage of cases in which cholecystectomy is performed but actually find stones in almost the same total percentage as the previous figures would indicate.

JAMES T. PRIESTLEY

GENERAL CONSIDERATIONS IN THE SURGICAL MANAGEMENT OF CHOLEDOCHOLITHIASIS

If the common duct is explored in search of a stone, the surgeon should not be satisfied until every effort has been made to discover a calculus. Likewise, if a stone or stones are found, a careful and thorough effort should be made to remove every calculus that is present.

One of the helpful procedures in being certain that all stones are removed from the extrahepatic and intrahepatic bile ducts after sounds and scoops have been employed, is the use of forceful irrigation of the ducts with physiologic saline solution. For this purpose a metal syringe (Figure 1) which holds 3 or 4 ounces (about 90 to 120 cc.) of fluid and has a tight-fitting

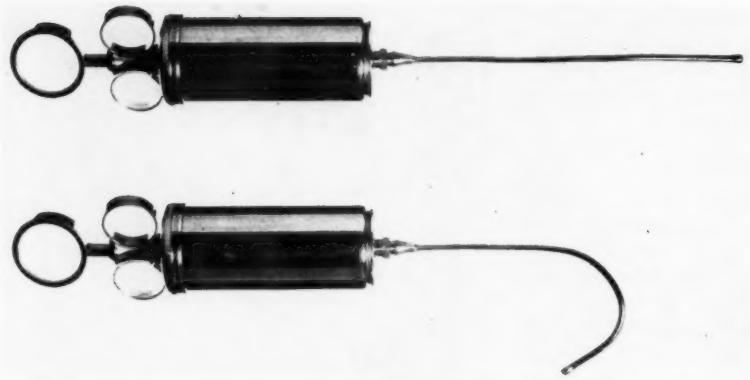

FIGURE 1. Metal syringe with long, malleable tip used for irrigation of bile ducts.

plunger and a long, blunt, malleable metal tip has been most useful. The flushing out of remaining calculi is dependent upon a strong return flow of fluid, and with a syringe of this type a stronger return flow is obtained than with the use of a catheter or a rubber bulb type of syringe. The long, malleable metal tip permits delivery of the irrigating solution to any desired area within the ducts. One should be careful that there is no pressure on any part of the ductal system or angulation of the duct at the time of irrigation, since either of these factors may interfere with the washing out of stones.

The use of cholangiography at the time of operation has been enthusiastically reported by some surgeons as an aid in removing all stones. Personally, I have not been impressed with the necessity of this procedure. Actually, if a stone is overlooked when the common duct is explored I think that it is almost always in one of the intrahepatic ducts, which, ordinarily, may not visualize well roentgenographically.

After stones have been removed from the common bile duct, one ordinarily closes the duct around a soft rubber T tube which is left in place for a variable period. The question which always arises then is how long the T tube should be left in place. While it is difficult to be dogmatic about this matter, it is my opinion that in general the tendency has been to leave a tube of this type in place for too long a period. Any foreign material as yet utilized in the form of a tube or splinting catheter in the common duct will cause precipitation of calcareous material around the tube if the latter is left in place long enough.

In the ordinary case it is my practice to leave the T tube in the common duct no longer than two weeks. It has been said by some that these tubes should be left in place until the bile ducts have returned to normal size in case they were enlarged. As a matter of fact, a return to normal size may take months or may never occur. As long as adequate drainage has been established by removal of all stones and no residual obstruction exists, continued presence of the tube would seem unnecessary. A choledochogram should always be made prior to removal of the tube in order to have additional evidence that there is no residual stone present. As a general rule, a T tube should not be removed prior to a week or ten days after its insertion because of the possibility that its extraction may result in tearing open the adjacent suture line in the common duct.

Anyone who has operated on enough patients who have choledocholithiasis will have had the unpleasant experience of finding a residual calculus when the postoperative choledochogram is made. The proper procedure under the circumstances always presents somewhat of a problem. Occasionally a shadow in a choledochogram taken prior to removal of the T tube (Figure 2) will result from the presence of soft, inspissated material or a blood clot. Such material may be removed by frequent irrigation of the T tube with physiologic saline solution. If an actual calculus is present, other types of irrigation may be employed. Personally, I have had little success with irrigations of this type but occasionally they may accomplish the desired purpose.

One such procedure consists of the "oil-ether" treatment. This is ordinarily performed

by injecting 5 cc. of a mixture of one-third ethyl alcohol and two-thirds ethyl ether. The tube is then clamped and allowed to remain clamped until the patient experiences considerable pain. At that time a pearl of amyl nitrite mixture is administered. This ordinarily relieves some of the pain and the clamp is left in place on the tube until the pain again becomes quite severe. The clamp is then removed and 5 cc. of warm olive oil is injected into the T tube. Unfortunately, the patient may experience a considerable reaction from this treatment, so that it is not without untoward effect. It may be repeated two or three times if it does not cause too much reaction.

If re-operation is performed it is best to defer it for at least three months following the original operation, during which time the T tube is left in place. Earlier operation is undesirable because of the friable and vascular nature of the tissues in the vicinity of the common duct.

FIGURE 2. Postoperative choledochogram which reveals a markedly dilated common bile duct. At operation a residual stone was found and removed.

STRICTURE OF COMMON DUCT

Cause and prevention—One of the most serious benign conditions encountered in the biliary tract is stricture of the common bile duct. The most important thing about this condition is its prevention. By far, the large majority of common duct strictures follow cholecystectomy. It is true that strictures may result from other causes such as stone, pancreatitis, and so forth, but the ordinary type of stricture almost invariably follows some previous operation on the biliary tract.

It is unfortunately true, for reasons which are not entirely clear, that stricture of the common bile duct has increased in frequency. For example, in 1945 at the Mayo Clinic we encountered exactly twice as many patients with common duct stricture as we did in 1943. In 1947 we saw almost three times as many patients with strictures of the common duct as we did in 1943. This increase in incidence of common duct stricture is out of all proportion to any increase in other phases of surgery of the biliary tract.

Lack of attention to certain details in the performance of cholecystectomy leads to most strictures of the common duct. In order to avoid injury to the common duct, adequate exposure is essential. This includes not only an incision of sufficient length and satisfactory anesthesia but also a clear field of vision in the immediate operative field.

A MISTAKE in identifying the cystic duct is probably the most common cause of injury to the common duct. This occurs most often in a thin woman whose structures at the hilus of the liver are extremely mobile and who has a cystic duct which enters the common duct at a very acute angle. Under these circumstances traction on the gallbladder and cystic duct will angulate the common duct in such a manner that it appears to be merely the lower portion of a long cystic duct, and accordingly it is clamped. A practice which will always prevent this occurrence is never to apply a clamp to the cystic duct until the common duct has been identified both proximally and distally to the cystic duct.

Another manner in which the common hepatic duct may be injured is by improper application of a clamp to the cystic duct. This clamp should be applied at a right angle to the long axis of the bed of the gallbladder in the liver. If the tip of the clamp is directed downward toward the patient's back and extends for an appreciable distance beyond the cystic duct it may include a portion of the common hepatic or right hepatic duct.

Occasionally the surgeon is startled by the sudden appearance of severe and unexpected hemorrhage in the region of the hilus of the liver. Under the circumstances, if a clamp is

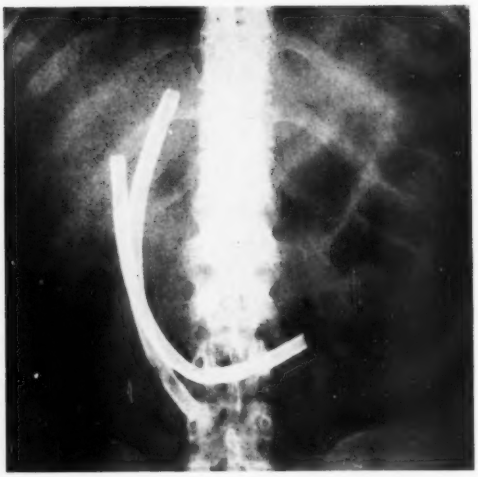

FIGURE 3. Plain postoperative roentgenogram of abdomen, showing soft rubber catheters inserted at operation when each hepatic duct was anastomosed separately to the duodenum.

hastily applied to control the bleeding point, one of the hepatic ducts may be included in the clamp. Instead of hastily applying the clamp under these circumstances one should control the bleeding with digital pressure either directly down on the bleeding point or by compression of the vessel at the hilus of the liver by inserting the index finger through the foramen of Winslow and placing the thumb on top of these structures. The field may then be cleared of blood, adequate exposure be obtained and the clamp be accurately applied.

Occasionally injury may occur to the common duct when cholecystectomy is performed for acute or subacute cholecystitis with stones and all of the tissues in the region of the cystic duct and common duct are edematous, inflamed and difficult to visualize. If the general principles mentioned previously are followed, however, injury of the common duct should be avoided even under these circumstances. Familiarity with anatomic and pathologic variations in the bile ducts is essential, of course, for one doing surgery in this field.

Surgical treatment—Many different surgical procedures have been suggested in the surgical treatment of common duct stricture. The mere fact that so many different operations have been tried is evidence in itself that no one of them is entirely satisfactory. Some surgeons are prone to employ one particular method of repair in the treatment of common duct stricture, but it has been my experience that it is preferable to be familiar with several different methods of repair and select the particular type that seems best suited to the individual case.

Most discussions today concerning treatment of common duct stricture revolve around the relative importance of intestinal reflux into the biliary tree. Without going into detail it might be said that certain surgeons feel that this is an extremely important factor in the postoperative result and that every effort should be made to avoid the possibility of such reflux. It has been my experience that reflux of this type seldom results in serious symptoms if there is no stasis in the biliary tree. This means that a satisfactory biliary intestinal anastomosis must be established and an adequate stoma maintained.

It has often been stated that reconstruction of the common bile duct is the operation of choice in the treatment of common duct stricture, primarily because such a procedure maintains the normal physiologic function of the ampulla of Vater. I am not at all certain that function in this region remains normal following the development of a common duct stricture and the subsequent operation for its correction. Nevertheless, this type of repair has been employed frequently and in some cases with considerable success. Unfortunately, re-formation of a stricture may occur at the site where the two ends of the duct were sutured.

RECONSTRUCTION of the duct is most applicable when an adequate stump of common hepatic duct remains to be united to a distal end of the common duct which is of sufficient size. An indwelling splinting tube of variable composition or a T tube is frequently employed when such reconstruction is made. One should remember, however, as mentioned previously, that a tube of any composition that is left in the common duct for a sufficient length of time will cause precipitation of calcareous material and become clogged. For this reason it is not advisable to leave any tube with a flange on it which is so constructed and so sutured in place that it may not pass into the intestinal tract in the course of a few months. If a T tube is employed, this should be brought out of the common duct at a site removed from the suture line by which the

duct is reconstructed. Precipitation in a T tube may be retarded by irrigation of the tube with physiologic saline solution once or twice a day.

An operation for stricture of the common duct which I have found satisfactory in a number of cases is hepaticoduodenostomy or hepaticojejunostomy. Quite often when there remains only a stump of common hepatic duct which is flush with the hilus of the liver, it is most conveniently anastomosed to the duodenum. This may be done over a soft rubber catheter which protrudes into the lumen of the small bowel and which is sutured in place with chromic catgut. This catheter remains in place until healing has occurred at the site of anastomosis and thereby helps to prevent contracture of the stoma. Ordinarily one uses as large a tube as will conveniently fit the biliary intestinal stoma that is created.

In some cases the stump of the common hepatic duct may be directly united to the jejunum more conveniently than to the duodenum. Occasionally, if no common hepatic duct remains, it may be necessary to suture each hepatic duct to the jejunum separately, in which event two tubes may be employed (Figure 3). I hesitate to use a Y-shaped type of splinting catheter in these cases because of the fact that such a catheter may not pass into the intestine. Splinting catheters of any type that become obstructed by calcareous material and which do not pass spontaneously in a reasonable time require surgical removal. While this is a simple surgical procedure, it is to be avoided if possible.

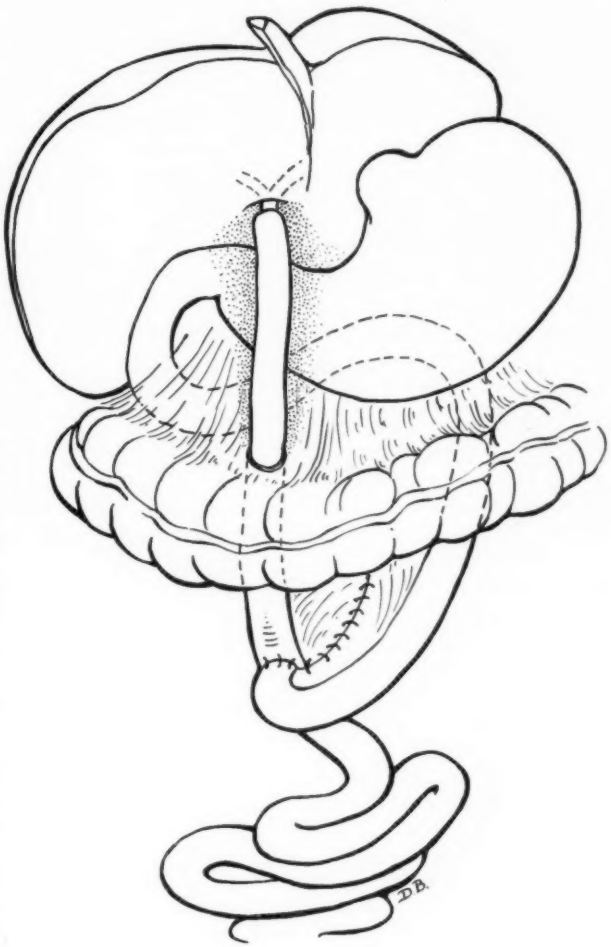

FIGURE 4. Diagrammatic representation of Roux-Y type of hepaticojejunostomy.

During the last few years a Roux-Y type of biliary intestinal anastomosis has been employed more frequently than was previously done. This procedure was introduced largely to prevent reflux of intestinal contents into the biliary tree. When this operation is performed, the jejunum is severed at the level where the distal loop of the jejunum will conveniently reach the hilus of the liver without tension. This loop is ordinarily brought through the mesocolon in the region of the hepatic flexure of the colon. The mesocolon is closed around the ascending loop of jejunum. The lower end of the upper loop of jejunum is anastomosed to the side of the lower loop of jejunum, which is brought up to the hilus of the liver (Figure 4).

While several different methods have been suggested for the actual anastomosis of the open end of the jejunum to the stump of the common hepatic duct, the one which I have found most satisfactory is a modification of the meth-

od described by Allen[2] which was first brought to my attention by Puestow.[3] This procedure entails suturing of the open end of the jejunum to the capsule of the liver or the hepatic parenchyma, as the case may be, surrounding the stump of the common hepatic duct. The stump of the duct is permitted to project into the lumen of the jejunum. This procedure is applicable whether or not any common hepatic duct remains. In my experience with this type of operation during the last few years I have been impressed with the infrequency of recurrent stricture, and I am inclined to favor its use more for this reason than for its prevention of reflux. A splinting catheter may or may not be used with this type of operation.

The operation described by Longmire and Sanford,[4] in which the left lobe of the liver is incised and a portion is resected in order to find the available portion of the biliary tree for anastomosis with the intestinal tract, may have application in an exceptional case. Although I have had no experience with this procedure personally and therefore hesitate to comment on its usefulness, it would appear on theoretical grounds to have a relatively small field of application. Late results after this operation in a significant number of cases have not yet been reported.

TUMORS OF THE BILE DUCTS

Although benign tumors and cysts of the bile ducts have been reported, these are very uncommon. Almost all tumors of the bile ducts are malignant. The region of the ampulla of Vater and the lower end of the common bile duct are the most frequent sites at which these tumors are found. They occur with somewhat less frequency at the junction of the cystic duct with the common bile duct and are found even less often in the cystic duct or the hepatic duct. The site of the lesion is of some importance, for it frequently determines what can be accomplished surgically for the patient.

In passing it might be mentioned that biliary calculi are found not infrequently in association with tumor of the bile ducts. In fact, this is true in approximately 40 per cent of cases. As a result, severe biliary colic and fluctuating jaundice, two findings which are uncommon in the presence of carcinoma of the pancreas, may be present when there is a tumor which arises within the bile ducts. A small neoplastic lesion in the region of the ampulla may be difficult to recognize at the time of operation. As palpation may fail to reveal a relatively small, soft, papillary type of neoplasm in this region, any unusual bleeding or the appearance of some unexpected bits of tissue in a scoop at the time when the lower end of the common duct is explored for stone should arouse the surgeon's suspicion concerning the presence of a neoplasm.

Obviously, complete removal of the growth and all adjacent tissues which are invaded by neoplastic cells constitutes the treatment of choice if such a procedure is practicable. Unfortunately, this may not be feasible, either because of the extent of local involvement by neoplasm or because of distant metastatic growths. Excision of a malignant tumor of the lower portion of the common bile duct generally requires a Whipple type of operation with removal of the head of the pancreas and subsequent re-implantation of the common duct into the intestinal tract. Transduodenal excision of a malignant lesion which arises in the lower end of the common bile duct usually does not permit removal of an adequate amount of tissue.

Late results after radical resection for carcinoma of the bile ducts are not entirely encouraging but in general they are superior to those obtained following a similar type of resection performed for carcinoma of the pancreas. In the experience of my colleagues and me the rate of resectability for carcinoma of the bile ducts is approximately twice as high as that for carcinoma of the pancreas. This may be explained by the fact that a malignant lesion which arises within the bile ducts does not have to become very large before it produces jaundice and thereby attracts attention which results in surgical exploration. In contrast, a similar type of lesion which arises in the pancreas, unless it is immediately adjacent to the common bile duct, frequently attains considerable size before jaundice or other significant symptoms result which lead to surgical investigation.

In our experience in Rochester, Minnesota, approximately 25 per cent of patients in whom exploration is performed for carcinoma of the bile ducts undergo resection of the lesion. In approximately 25 per cent exploration alone is carried out, and in the remaining 50 per cent of patients who have lesions of this type only some palliative surgical procedure is accomplished. The latter consists in either external or internal biliary drainage. Internal biliary

drainage is more desirable than external drainage and is always employed unless the neoplasm arises or has extended so close to the hepatic parenchyma that it is impossible to accomplish an internal biliary intestinal anastomosis.

CARCINOMA OF THE PANCREAS

Malignant lesions in the head of the pancreas frequently cause jaundice, and their surgical treatment commonly necessitates an operation which involves the common bile duct. Unfortunately, many of these lesions are too far advanced to permit cure by operation when they are first detected. If a lesion of this type cannot be removed in its entirety, resection, which is such a formidable procedure, hardly seems justified. In our experience only about 13 per cent of patients who have carcinoma of the pancreas undergo resection. In approximately 30 per cent exploration alone is carried out, and in the remaining 57 per cent some palliative procedure is performed, which in most cases is cholecystojejunostomy, established as a side-to-side type of anastomosis. Late results following radical resection of the head of the pancreas for carcinoma have been rather disappointing, but here, as in dealing with carcinoma elsewhere in the body, resection of the lesion seems indicated if the surgeon feels that he can remove it in its entirety.

Many different technical procedures have been suggested and used in the performance of this operation. The one which I have found most satisfactory includes removal of the distal portion of the stomach, the duodenum, the head of the pancreas and the lower end of the common bile duct. The jejunum is then mobilized in the region of the ligament of Treitz and is pulled upward so that it occupies the position formerly occupied by the duodenum. The resected end of the pancreas then is implanted in the end of this jejunal loop. A short distance distal to the pancreaticojejunal union the common bile duct is implanted into the jejunum. Posterior gastrojejunostomy is then performed, the end of the stomach being anastomosed to the side of the jejunum.

It is to be hoped that the cytologic diagnosis of cancer of the bile ducts and perhaps of the pancreas established on study of duodenal contents will permit earlier recognition of these lesions and thereby a higher percentage of cures.

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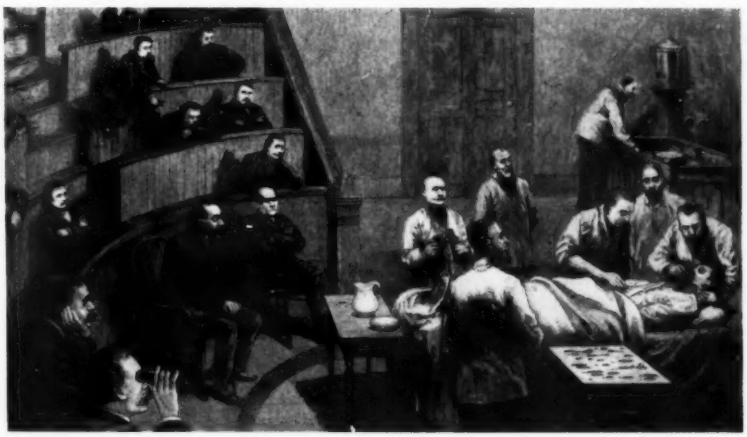

Scene in the operating amphitheater of Massachusetts General Hospital, 1888.

Cytodiagnosis in Gastric Carcinoma

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NEARLY one-fourth of all deaths due to cancer are caused by cancer of the stomach, almost 40,000 deaths being ascribed to this cause yearly in the United States,[1] and the number of deaths closely approximates the incidence of the disease. It is in the rare case of cancer of the stomach which is diagnosed sufficiently early that the surgeon can hope to remove all traces of diseased tissue. The advanced stage in which this disease is usually diagnosed is a result of the fact that we have no adequate means of arriving at an early diagnosis combined with the fact that very early cancer of the stomach is asymptomatic, and the early symptoms are so vague that patients seldom seek expensive diagnostic procedures before the obstructive symptoms, extreme weight loss, pain, or hemorrhage occur.

Diagnostic advances have not kept pace with the vast improvements in the surgical technic of gastric resection. Fluoroscopy, in the hands of a skilled radiologic diagnostician, is still our best hope for early diagnosis. Gastroscopy offers technical difficulties, and biopsy at the time of gastroscopy may cause dangerous bleeding. Hypoacidity found on gastric analysis is far from being a diagnosis of early cancer. Exfoliative cytology has not yet proved itself to be either useful or reliable as a screening test when done on gastric aspirations.

The seriousness of the need for improved diagnostic technics was stressed in an editorial in the September 1948 issue of *Postgraduate Medicine* where Dr. Russell L. Cecil stated: "Improvement in survival rates from gastric cancer depends almost entirely upon earlier diagnosis of gastric lesions. Several new technics are now being studied, which undoubtedly will lead to more accurate diagnoses. At the present time, however, relatively few diagnosticians are competent in the use of these technics. . . . Perhaps the most interesting diagnostic development is the use of the Papanicolaou technic in detecting exfoliated malignant epithelial cells in gastric contents. This may prove to be the 'screening test' that so many have been hopeful of developing."[2]

It is certainly true that cytodiagnosis of cancer (exfoliative cytology) is gaining widespread popularity with smears being made of material obtained from almost any body source in the effort to diagnose cancer while it is in an early stage.[3] It is possible to find cancer cells in smears made from urine, sputum, gastric washings, peritoneal fluid, bronchoscopic washings, rectal washings, vaginal aspirations or scrapings, but the cytologist interpreting the smears must be trained to recognize cancer cells as well as the normal cells which one might expect to find in smears from various locations of the body. Cancer cells must be distinguished from cells which show other types of abnormal changes, such as infection, nonmalignant neoplasms, benign ulcerations, or radiation changes. Rigid training and extensive experience are necessary to become proficient in reading any type of smear, and such training and experience have as yet been available to only a limited number of investigators.

In addition to the other limitations of exfoliative cytology, all smears present difficulties in their preparation. This is particularly true of gastric smears. It is the purpose of this brief report to outline in detail one successful method for making gastric smears for detecting gastric cancer cells and to submit an illustrative case history.

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METHOD

The following are the steps in the preparation of the smear:

1. Food by mouth is withheld for at least twelve hours.

2. A stomach tube is inserted. (A Levine tube should *not* be used as its caliber is too small.) A stomach tube with a 1 cm. lumen is found in every hospital emergency room and is satisfactory. Induced vomiting may precede this step if desired. Normal saline is used to wash the stomach. At least 8 liters of fluid should be used after all visible food particles have been evacuated. The patient should be instructed not to swallow during the washing process.

3. The gastric washings should now be macroscopically free of mucus and debris and the specimen can be obtained. About 50 to 100 cc. of normal saline is admitted through the stomach tube by means of a syringe and then aspirated and reinserted three or four times. If practical the patient's position is shifted between aspirations. When finally aspirated the fluid volume of the specimen should measure about 50 cc.

4. The aspirated specimen is *immediately* put into a flask containing approximately an equal volume of 10 per cent formalin and agitated gently to bring about uniform fixation but not vigorously enough to break up any possible tissue fragments which might be present.

5. The flask is taken (preferably within a few hours) to the laboratory and the contents centrifuged at 5,000 to 7,000 r.p.m. for ten minutes. The supernatant fluid is decanted leaving moist sediment in the tube.

6. Smears are made from the sediment. Slides for receiving the smear are prepared by spreading with a clean finger a thin film of egg albumin fixative (50 per cent fresh egg white and 50 per cent pure glycerin well mixed) on the surface of a clean glass slide. Sediment is spread thinly on this surface with a clean, somewhat pointed, thin glass rod. A diamond pencil is used to mark the identification on each slide prepared.

7. The slide is immersed in a solution composed of equal parts of alcohol and ether before the smear is dry and allowed to remain for at least thirty minutes. Alcohol for this solution may be either absolute methyl or 95 per cent ethyl. The slides may remain in the solution for hours, overnight, or longer if desired.

8. Staining by any adequate differential stain is then done. Hematoxylin and eosin technic giving good cytoplasmic-nuclear differentiation is as follows:

Remove the slides from the alcohol-ether fixative and handle them as follows:

a. Let stand five minutes in water.

b. Let stand one minute in Harris hematoxylin[4] to which glacial acetic acid has been added (4 cc. glacial acetic acid to 95 cc. Harris hematoxylin).

c. Dip 5 times in water.

d. Dip 3 times in ammonia water (2 drops concentrated ammonium hydroxide to 100 cc. water).

e. Rinse ten minutes in running water bath.

f. Let stand ten minutes in 1 per cent aqueous eosin with a pinch of anhydrous calcium chloride added.

g. Dip once in water.

h. Dip 2 times in 50 per cent ethyl alcohol.

i. Dip 2 times in 75 per cent ethyl alcohol.

j. Let stand for three minutes in 95 per cent ethyl alcohol.

k. Let stand three minutes in absolute ethyl alcohol.

l. Clear five minutes in each of 2 xylol baths.

9. The slides are covered and are now ready for interpretation.

In addition to making smears from the sediment obtained from gastric washings, some investigators[5,6] recommend embedding the sediment in a paraffin block. Where sufficient sediment is obtained, the sediment remaining after 6 smears are made is first dehydrated with acetone and then treated as a small tissue. Sectioned sediment sometimes approximates a biopsy as cell relationships in the tissue may be present in small fragments. Where visible fragments of sufficient size appear in the specimen, they are removed before centrifuging and treated as tissue biopsy.

Smears are studied under low (10 x objective) and

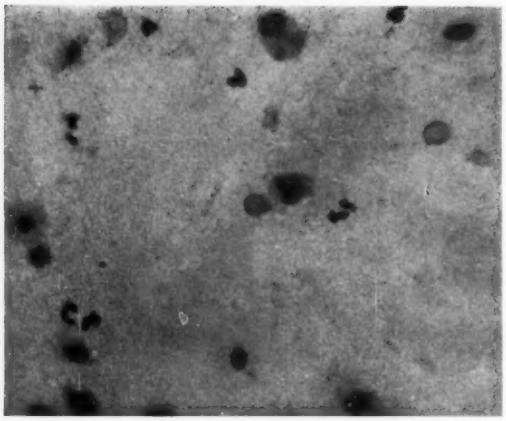

FIGURE 1. Normal stomach lining cells in a smear made from stomach washings from a noncancerous patient. Note eccentric normal nucleus in profile view of glandular cell on left and central compact nucleus in cross section view of same type of cell at lower center. x 675. Case: G. W. H. x J. R. 2027A.

high-dry (43 x objective) powers using 15 x wide-field oculars in a binocular microscope. A mechanical stage is used to assure covering every area on each slide. Five or six slides may be thus studied on each case before any opinion can be reached. Evaluation of sections of sediment is done in the same way as that required for smears but is less tedious because the cells are more compact and appear all in the same focal plane.

In the gastrointestinal department at George Washington University these steps are carried out by a diagnostic team. The patient on whom gastric washings are to be studied cytologically is prepared by a member of the hospital house staff who has made a specialty of this technic. He obtains the specimen and puts it into the 10 per cent formalin at the bedside. He then takes the patient directly to the gastroscopic department where the gastroscopist receives a patient whose stomach is well washed for this procedure.

The gastric washing specimen in formalin is delivered to the cancer clinic's cytology laboratory where the smears are prepared by a specially trained cytodiagnostic technician who also makes paraffin blocks when indicated. The stained smears are delivered to the cancer cytologist for interpretation. Where a large fragment is obtained the slide is submitted to the pathologist who may be able to arrive at a histologic diagnosis.

The smear interpretation is *not* considered as a diagnosis but is regarded as an opinion which, together with the findings at gastroscopy and fluoroscopy, may aid the gastroenterologist to arrive at a diagnosis.

RESULTS

Prior to starting this method of preparing gastric smears, we had attempted cytologic studies from 10 gastric aspirations with little or no success in arriving at conclusions as to the nature of the cells. Our percentage of accuracy was nearly zero. The present method has been applied to only a few cases, 5 of which might be reported. Of these, 2 have shown only normal cells and the patients have not been found to have cancer of the stomach by any diagnostic procedure. The other 3 have shown cancer cells in the smears and they have all been found to have cancer of the stomach.

In studying the smears the cytologist sees mucus, debris, bacteria, white blood cells, red blood cells, and glandular epithelium. Squamous cells from the mouth and esophagus should be at a minimum in a properly prepared specimen. If cancer cells are present, they are distinguished from normal glandular cells by the (1) large size of the cells, (2) eccentric nucleus, (3) hyperchromatic cytoplasm and nucleus, (4) nuclear-cytoplasmic disproportion, (5) bizarre shape of the nucleus, (6) intranuclear abnormalities such as bizarre nucleoli, or (7) atypical division forms.

The photomicrographs pictured here illustrate the cytology. Figure 1 shows normal stomach lining cells from a patient who was not found to have cancer. These cells are seen both in profile and in cross section. Figures 2, 3, 4, and 5 are from the same cancer patient, the one presented here as a case history, while Figure 6 is from a different cancer patient.

Figure 2 shows gastric cancer cells as they appear in a smear and Figure 3 is a high-power view of two carcinoma cells in a smear. Figure 4 is an unusual photomicrograph of a stray cancer cell seen under high power in a section of the surgical specimen of gastric carcinoma. The slide is the same as that pictured in Figure 5, which is a low-power view of the section. Figure 6 is a sectioned fragment obtained at gastric washing. This section was submitted to a pathologist who was able to arrive at a histologic diagnosis.

CASE REPORT

W. C. (978-48), a 50-year-old colored male, was brought to Warwick Memorial Clinic on a stretcher with a tentative diagnosis of carcinoma of the pancreas. His chief complaints were weakness and loss of appetite becoming increasingly marked for one year. He had no pain. Two

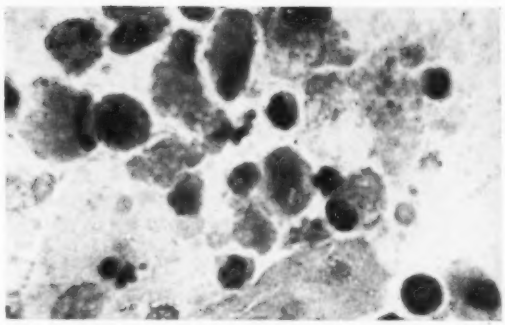

FIGURE 2. Group of cancer cells seen in a smear made from stomach washings of a cancer patient. Note irregularly shaped deep staining nuclei in glandular cells. A normal glandular cell is seen in profile in the center. x 675. Case: W. C. 978-48.

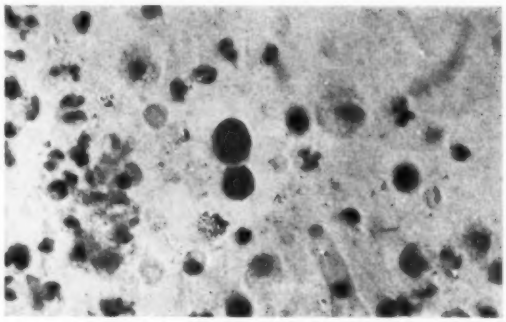

FIGURE 3. High power view of two cancer cells seen in smear made from gastric washings. Compare with central cell in Figure 4. x 675. Case: W. C. 978-48.

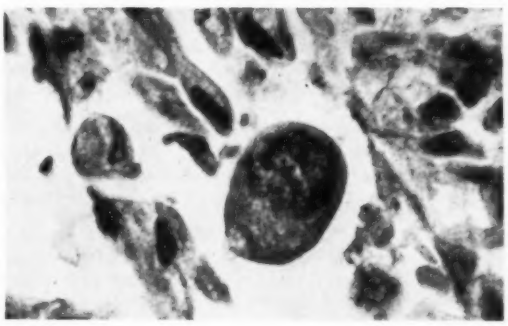

FIGURE 4. High power view of a stray cancer cell seen in section of surgical specimen from adenocarcinoma of stomach. x 675. Case: W. C. 978-48.

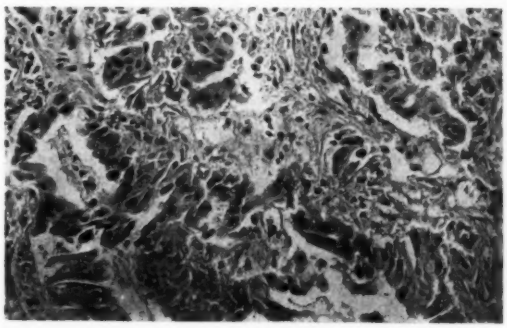

FIGURE 5. Low power view of section of surgical specimen of adenocarcinoma of stomach. x 150. Case: W. C. 978-48.

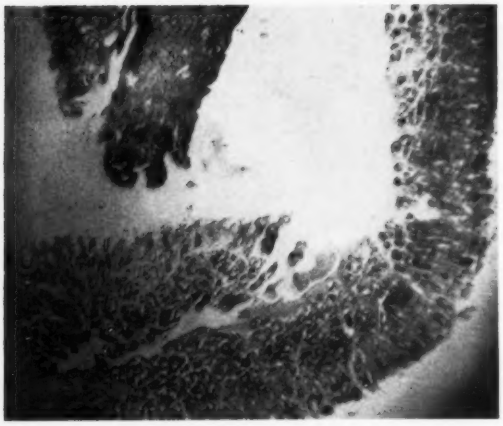

FIGURE 6. Lower power view of section of an unusually large fragment obtained at gastric washing. x 30. Case: G. W. H. x R. D. 38-10-28.

months prior to admission he had suffered with nausea and vomiting, but this had disappeared. There was no history of bloody vomitus or bloody stools. He was having one normal bowel movement a week. He had lost about 30 pounds in the last two or three months.

Physical examination revealed an emaciated, weak, listless, pale, and very anemic elderly colored man. His abdomen was sunken and the lower portion was soft. The epigastric region was firm and there was an impression of a mass in the right epigastrium. Firm non-tender nodes were felt in the cervical, axillary, and inguinal areas.

He was hospitalized for supportive medical treatment and diagnostic procedures. X-ray studies showed the stomach to be so greatly dilated that accurate interpretation was impossible. A chest film was negative. A biopsy of one of the axillary lymph nodes showed tuberculosis. Cytologic study of gastric washings was done and cancer cells were found as shown in Figures 2 and 3.

The patient was placed on a rigorous medical regimen of intravenous feedings, blood transfusions, and gastric decompression in preparation for surgery. A subtotal gastric resection was done with regional lymph node dissection. A fungating cancer about 3 by 2 cm. was found on the lesser curvature adjacent to the pylorus and regional lymph nodes were involved. The section shown in Figure 5 is from the surgical specimen.

After three weeks the patient was discharged from the hospital greatly improved. In the next three months he gained 50 pounds and is at present working. Recent fluoroscopy demonstrated no recurrence nor extension of the disease.

DISCUSSION

THE case presented illustrates a useful application of exfoliative cytology to aid in arriving at a diagnosis in a confusing case of a patient who did not have *early* cancer of the stomach. We have not yet been successful in finding cancer cells in an early case; however, our work in this field has only started. We have not yet tried to persuade patients with vague digestive complaints to submit to this vigorous gastric washing, nor have we yet used the method on many ulcer patients.

We do not contemplate using our present method as a screening test for large groups of the population. Even if the trained personnel and the funds were available to set up such a program, it is very doubtful if many patients would seek the services of our team as they do the facilities of the cancer detection clinics.

While it is not practicable to offer this service to all patients in a cancer detection center, cancer of the stomach occurs in statistically important enough increased incidence in certain groups of people that it might be fruitful to subject them to this type of meticulous gastric washing. Since the stomach is the most common site of cancer in men after age 30 and in women after age 55, and since so many of these unfortunate cancer patients give a history of having had vague indigestion preceding the diagnosis of their fatal cancer of the stomach, gastric washings might be done on all men over 30 and women over 55 who give a history of vague indigestion. Unexplained low acidity on gastric analysis might well be considered an indication for doing gastric washings for cytologic study.

Pernicious anemia patients are known to show a high incidence of gastric cancer and should, therefore, be studied repeatedly in an effort to find possible stomach cancer early. Again, since the question of chronic ulcers as "premalignant lesions" is not settled, and since the character of an ulcer is not known until the specimen is under the pathologist's microscope, patients with chronic gastric ulcers should, at least, have the benefit of cytologic study of gastric washings.

Another group of patients are suitable subjects for this study; viz., patients "cured" of cancer of any other organ, since cancer of the stomach occurs more frequently in such patients than it does in the general population.

It is wasteful of the cytologist's time to make smears for cytologic study from material aspirated from an inadequately prepared stomach. Cancer cells are easily digested into unrecognizable debris and epithelial cells are easily lost in mucus and

debris on a smear. An aspiration obtained in the manner of those used for gastric analysis or for acid-fast stain are unsatisfactory for cancer cytology. Hence, the first step in making a gastric smear for cancer detection is *adequate* preparation of the patient for obtaining the specimen. The method described here may seem too thorough, for it is certainly more rigorous than that finally decided upon by Ulfelder and his co-workers,[7] but the smears obtained are eminently satisfactory for the study of epithelial cells.

If the specimen is not put immediately into formalin at the bedside, it has no more value than one obtained from an inadequately washed stomach, because digestive enzymes and bacteria soon destroy the cells present in the warm specimen. In addition, the preservative makes it possible to transport the specimen and to delay the processing of the material. This may be very important where the laboratory is many miles from the clinic or hospital where the specimen is obtained or where a number of different people are involved in the various steps in the preparation of the smear.

These two steps in preparing the smears were not used by Block and his associates[8] who give the following figures on 242 gastric aspirations: 4 per cent false positive and 8 per cent inconclusive on 148 "proved" negative cases; on 39 cases proved negative at operation 21 per cent false positives were reported and 10 per cent inconclusive smears were read; on 26 cases proved malignant at laparotomy 46 per cent false negatives were reported, 30 per cent correct positives, 15 per cent inconclusive. In all cases with a final diagnosis of cancer of the stomach, they found the aspiration technic correct in only 38 per cent. Ulfelder and others[9] reported an error of 37.5 per cent on gastric aspirations on 24 cases of proved stomach cancer. A test with such low percentage of accuracy is hardly one on which to depend for a diagnosis. With later improved methods of obtaining the specimen Ulfelder[7] reported 12 positive smears on 14 proved cancer cases (85.7 per cent). Perhaps with further refinements in technic, gastric cytology may approach reliability.

STAINING the smears presents special problems to the cytodiagnostic technician regardless of whether hematoxylin and eosin or the more complex Papanicolaou stain is used. Smears of varying thickness and those from different sources take the stain very differently. Hence, the technician needs to inspect each slide or group of slides and to evaluate the nucleo-cytoplasmic differentiation in order to adjust timing in the various solutions for best results. All stains and solutions must be filtered at frequent intervals to avoid contamination of floating cells from slide to slide. Embedding sediments is a specialized time-consuming technic which presents technical difficulties which the cytodiagnostic technician must master. Technicians accustomed to routine tissue section work need special training and experience before they can prepare satisfactory slides for cytologic study.

Studying the smears is tedious eye-straining work for the cytologist. Finding in the midst of debris, red blood cells, white blood cells, and mucus, a few scattered cells or groups of cells such as those pictured in Figures 3 and 4 requires patience and conscientious searching on the part of an experienced and trained cancer cytologist. Examining more than one smear made from carefully prepared sediment increases the chance of finding these cells. The average time spent by the cytologist in studying a single slide is fifteen to twenty minutes.

The amount of time consumed by this method is staggering. Washing the stomach and obtaining the specimen takes about three hours. Even a cooperative patient does not enjoy the process. Preparing the smears and staining them in the laboratory requires at least another hour. An hour or two is easily spent by the cytologist in studying the smears. A test requiring five or six hours is not likely to gain widespread popularity as a screening test. This is not a simple test like a routine blood count or a serologic test for syphilis.

In cancer detection work of this kind the spirit of the hunter in search of a few cells which may be present is as necessary a part of the cytologist's armamentarium as is training and experience. This is not necessarily true of the pathologist looking at tissue sections. A well-trained and experienced pathologist is needed to interpret tissue sections of cancer specimens but such a pathologist usually does not need to view every area of the slide in minute detail in order to arrive at a diagnosis. A skilled pathologist kept busy interpreting sections of operative specimens may find that this kind of detailed cytologic work is more annoying than profitable. Cytodiagnostic work in cancer detection requires specially trained doctors who are also emotionally fitted for this tedious type of work.

CONCLUSIONS

Cytodiagnostic methods offer a useful tool to aid in the diagnosis of cancer of the stomach but results thus far are far from infallible and methods are expensive because they are time consuming for highly trained personnel. Consequently the use of exfoliative cytology for studying possible gastric carcinoma is not likely to gain popular usage as a screening test for large groups of the population even as a routine test in cancer detection centers. However, as one of a battery of tests used in studying stomach cases, exfoliative cytology has a definite place.

It is to be hoped that more patients with minimal gastric symptoms and all patients with chronic ulcer symptoms may be given the benefit of a combination of tests including cytology, gastric analysis, gastroscopy, fluoroscopy, and x-ray film study. So far no one of these methods has proved to be the answer to the problem of early diagnosis of stomach cancer but together they offer the best chance of arriving at an early diagnosis.

Cytodiagnostic methods for the stomach are still in the process of development especially with reference to methods of obtaining the specimen and to the training of cytologists who have the peculiar talent required for this tedious and highly technical diagnostic technic. At Warwick Memorial Clinic we feel that the specimen is easier to handle and to interpret if obtained from an adequately washed stomach and if immediately placed in the fixative at the bedside. Certainly the method merits further study and five study projects are suggested.

Each of the following groups of patients could receive cytologic studies of gastric washings: (1) all patients with unexplained low acid after histamine, (2) all chronic ulcer patients, (3) any patient "cured" of cancer of some other organ, especially if mild indigestion is a complaint, (4) any woman over 55 or any man over 30 with symptoms of vague indigestion, and (5) any patient who has had pernicious anemia for several years.

By careful studies on each of the above groups three purposes would be served: another check on the value of low acid as an indication of gastric cancer might result; statistics for evaluating gastric washings as a means of cytologically detecting gastric cancer would be obtained; and, last but most important, a number of gastric cancer cases might reach surgery early enough for our surgeons to hope for a cure.

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The photomicrographs were prepared by Frank Delaney of the Audio-Visual Department of the George Washington University.

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Treatment of Hereditary Cephalalgia

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For many years severe headaches of a recurrent nature were diagnosed as migraine; more recently these headaches have been differentiated into several groups. Among the terms employed to describe these groups at present are: migraine, atypical migraine, tension headaches, histaminic cephalalgia, atypical histaminic cephalalgia, and unclassified headaches. Many of these types have overlapping characteristics, and one or more may be present in the same patient.

The advent of the encephalogram has made it possible to obtain in many individuals positive objective findings which may be interpreted as consistent with a paroxysmal basis for the headache. Individuals giving a family history of paroxysmal severe headaches and having such headaches themselves, may be grouped together under the term *hereditary cephalalgia,* without attempting to differentiate the various subdivisions mentioned above.

The present study has been made on 35 patients who have recurrent severe headaches, and who give positive family histories of paroxysmal cephalalgia. Many of these have had electro-encephalographic tracings made and a few who have been given Mesantoin (methyl-phenyl-ethyl-hydantoin) are reported. However, the chief purpose of this paper is to report the comparison between various ergot preparations: ergotamine tartrate (Gynergen) and dihydroergotamine methanesulfonate (D.H.E. 45); ergotamine tartrate with caffeine (Cafergone), and caffeine alone.

Results in each patient represent several trials as it is not unusual to find individuals in whom a medicine when first tried will give relief from the headaches, but will not continue to do so. The dosages of the drugs used were: Gynergen, 0.5 to 1.0 mg. subcutaneously or 2 to 5 mg. orally; D.H.E. 45, 1 to 2 mg. intravenously or subcutaneously; Cafergone, 1 to 3 tablets (1 mg. ergotamine tartrate and 100 mg. caffeine per tablet) orally; and caffeine 100 to 300 mg. orally.

*Departments of Anatomy and Medicine, Washington University School of Medicine and the Barnes Hospital, St. Louis, Missouri.

DISCUSSION OF RESULTS

Table 1 gives the results obtained with the various forms of medication. Gynergen, subcutaneously, is by far the most effective, excellent results being obtained in 80 per cent of the patients, and good results in 20 per cent. There were no failures in this group. Alvarez, in discussing the treatment of migraine, stated that Gynergen is effective in about 90 per cent of the cases in which it is used.

D.H.E. 45 is not quite as effective as Gynergen, giving excellent results in 60 per cent, good results in 28 per cent, and poor or no results in 12 per cent. In general, it is most effective when given intravenously, and has fewer side effects than Gynergen. Oral administration of Gynergen, even in larger doses, is not nearly as effective as Gynergen given subcutaneously. In 22 patients in whom this preparation was used orally, or sublingually, only 1 had excellent results, and 18 (82 per cent) had poor results.

Caffeine alone was administered to 17 patients who had successive attacks. Several others received it for one attack without results. Only 1 of these patients received any benefit and in another, the headaches were made definitely worse by caffeine. These patients are not included in Table 1.

The combination of caffeine and ergotamine tartrate (Cafergone) appears to be definitely better than either drug alone. Of 34 patients tried on the combination 18 per cent received excellent, and 35 per cent good results; 1 patient was worse—the same patient who received no results with Gynergen, orally, and was made worse with caffeine alone. Others (Hansel, Ryan, Horton and Kadish) have reported results with Cafergone in as low as 20 per cent to as high as 93 per cent in various forms of cephalalgia.

Of the 34 patients in this series with hereditary cephalalgia who were given Cafergone, 53 per cent reported excellent to good results. The necessity of giving medication as early as possible has been emphasized by others, and may be re-emphasized here.

Alvarez reviewed the various drugs and procedures which have been employed to avoid attacks of mi-

TABLE 1

RESULTS IN TREATMENT OF HEREDITARY CEPHALALGIA

AGE AND SEX	GYNERGEN *subcutaneously*	D.H.E. 45 *subcutaneously and intravenously*	GYNERGEN *orally*	CAFERGONE *orally*	CAFFEINE *orally*
60 M	Excellent	Good	None	Poor	None
44 M		Excellent	None	None	None
36 M				Good	None
45 M		Excellent		None	
56 M	Good	Excellent (IV)		Good	
60 M	Excellent	Excellent	None	None	None
30 F				Excellent	
39 F	Excellent	Excellent	Excellent	Good	None
39 F	Excellent	Excellent	Fair	Good	None
54 F	Excellent	None	None	None	None
45 F	Good	Good	None	Worse	Worse
27 F		Excellent		Good	None
28 F		Good	None	None	
42 F	Excellent	Excellent	None	None	
25 F	Excellent			Good	Good
16 F				Excellent	None
30 F	Excellent	Good	None	None	None
27 F	Excellent	Excellent	None	None	None
37 F	Good	Good	None	None	
49 F	Excellent	Poor	None	None	
33 F	Excellent			None	
60 F	Excellent	Excellent	Poor	Good	
34 F		Excellent		Excellent	
37 F		Excellent (IV)		Poor	Poor
33 F	Good			Good	
39 F	Excellent	Poor	Poor	Excellent	None
43 F		Excellent	Excellent		
47 F	Excellent	Excellent (IV)	Poor	Poor	
41 F	Excellent	Good	None	Good	
52 F	Excellent		Good	Good	None
21 F	Excellent	Excellent		Good	
42 F	Excellent			Good	
49 F	Excellent		Poor	Good	
50 F	Good	Good	None	None	None
33 F	Excellent		Poor	Excellent	

TOTALS

NUMBER OF PATIENTS	25		25		22		34		17	
	Number	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*	*Number*	*Per Cent*
EXCELLENT RESULTS	20	80	15	60	1	4.5	6	18		
GOOD RESULTS ...	5	20	7	28	2	9	12	35	1	6
FAIR RESULTS ...					1	4.5				
POOR OR NO RESULTS			3	12	18	82	15	44	15	88
WORSE							1	3	1	6

graine, and stated that so far nothing has been found to be consistently effective. In view of the electroencephalographic findings in many patients with hereditary cephalalgia, it was decided to try anticonvulsants further. Of the several anticonvulsants tried, Mesantoin (methyl-phenyl-ethyl-hydantoin) appeared to give the best results with fewer side effects. Accordingly, this preparation is now being used exclusively in a number of patients. Fifteen patients have been given this medication a sufficient length of time to provide conclusive results (Table 2). The dosage of Mesantoin has varied from 0.1 to 0.6 gm. (1 to 6 tablets) daily. Early results with this medication in decreasing the number and severity of the headaches are most encouraging, but only further study will indicate its true value.

SUMMARY

1. Ergotamine tartrate (Gynergen) subcutaneously is the most effective drug in relieving attacks of hereditary cephalalgia.

TABLE 2

RESULTS IN TREATMENT OF HEREDITARY CEPHALALGIA WITH MESANTOIN

AGE AND SEX	E.E.G. FINDINGS	DAILY DOSAGE, GM.	RESULTS
67 F	Consistent*	0.4	Questionable improvement
34 F	Consistent	0.2	Improved**
27 M	Consistent	0.3	Marked improvement
27 F	Consistent	0.3	Improved—tired
49 F	Consistent	0.5	Improved
33 F	Borderline†	0.2 to 0.5	Marked improvement—dizzy
30 F	Consistent	0.3	Improved
36 F	Consistent	0.2	Improved
47 F		0.2	Improved
23 F		0.2	Improved
25 F		0.1	Improved
37 F		0.4	Marked improvement
39 F		0.1	Improved
41 F		0.3	None
40 F		0.2	Improved

*Consistent—E.E.G. record showing dysrhythmia consistent with a paroxysmal contributory basis for symptoms.
**Improved—Decrease in number and severity of attacks.
†Borderline—E.E.G. record showing borderline dysrhythmia.

2. Dihydroergotamine methanesulfonate (D.H.E. 45), given intravenously or subcutaneously, is almost as effective as ergotamine tartrate, and has fewer side effects.

3. Ergotamine tartrate and caffeine in combination (Cafergone) is much more effective than either drug separately, when given orally. Since it can be given by mouth, it should be the drug of choice in those patients for whom it is effective.

4. Mesantoin (methyl-phenyl-ethyl-hydantoin) is apparently effective in decreasing the frequency and severity of attacks of hereditary cephalalgia.

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RESIDENCY TRAINING REQUIREMENTS

THE American Board of Obstetrics and Gynecology has not made nor is it contemplating any changes in its residency training requirements, despite rumors of an increase in training years. Eligibility requirements remain the same, namely, three years of acceptable formal training, followed by at least two years of post-training practice in the specialty.

This Board has no objection to residency services being arranged by hospitals for periods longer than three years, unless this dilutes the candidate's clinical training opportunities too much during the first three years. However, the Board does not accept a fourth year, or more, of residency training as a substitute for any part of the required two years of post-training practice.

The only exception to this ruling is in the case of men advancing from their training into full-time teaching positions. These men then must complete at least two years in such positions.

PAUL TITUS, M.D., *Secretary, American Board of Obstetrics and Gynecology*

Male Sexual Relationships

DEVIATIONS FROM THE NORMAL

CHRISTIAN P. SEGARD

NEW YORK

The physician has not always been willing to supply information regarding the sex life of men. In the past it has been left to those less capable of giving the information but who nevertheless attempted to do a much needed job. The advice given was usually in a form that left out a great deal that might well have received attention. It did not enter the field of abnormal sex activity to any extent. It did leave the idea that masturbation if continued would lead to dire mental and physical changes.

There are many deviations from a normal sex relationship that are popularly considered abnormal and therefore "taboo." In reality such deviations from normal may well be classed as normal. After all conception may well take place in the majority of these deviations.

Ideas and opinions regarding this subject have become a part of the popular attitude. Few people will discuss them reasonably since an act on which society frowns leads to ostracism. They do not wish to be recognized as one familiar or identical with society's outcasts. Questions that lead to a self-confession can seldom if ever be answered without considerable reservation or at least half-truths.

Since the physician did not make it his professional responsibility to see that normal and abnormal sex relationships are understood, there developed a lay understanding that did not coincide with known physiologic and pathologic facts. If the group that knows most about a social or moral diversion from accepted relationships does not assume a major responsibility, then others less informed will do so. They have done so in this instance and no blame can be placed on them. The fault is with the physician who has not kept pace with social changes in attitudes, lay literature regarding medical developments and the open and above-board discussion of sex in conversations, published articles and books. Books of doubtful value, if not actually harmful, regarding normal and certain abnormal sex relationships accepted almost as family reading material are within the reach of all. They are harmful when they instill or leave a false idea regarding the abnormal sex act without the facts of their origin. Misunderstandings always occur even among clear thinking people when scientific data are presented for lay consumption.

A clearer understanding of the possibilities of what the physician may find in the field is here presented. It is the result of forty years of physical and medical examinations in Y.M.C.A., schools, colleges, and in industry. No questionnaires were used and no leading questions were asked except where misunderstanding of terms occurred. The information given was voluntary. It arose almost entirely because the individual desired information that would help him rather than through questions which cannot be answered without embarrassment. And no attempt will be made to report figures though perhaps fifty thousand people of both sexes and all ages were seen. Few presented sex problems. Fewer still belonged to the group exhibiting contrary sexual instincts.

The subject matter of this paper will be limited to the title. In general no reference will be made to normal sexual intercourse in or out of wedlock, to the female relationship, or to the sadistic and the masochistic.

MALE SEXUAL PREPARATION

The highest level to which a desirable emotional reaction can rise in the average human is secured in satisfactory sexual intercourse. (The only possible exception is religious exaltation to which many

strive but few attain.) In order to reach this emotional level through physical means the male undergoes a period of preparation. The length of time varies with age, the source of the stimulation, and the mental depth of the interest. The period ends when the corpus cavernosa is fully engorged with blood and a condition of "penis erectus" is maintained. This condition is necessary in all cases except sodomy (certain forms), senility, where a hermaphrodite is involved, and in certain cases of masturbation.

At the start of and during the period of preparation a combination of sensory and cerebral stimulation takes place. A thought or any one of the senses separately may initiate sex interest. The eye may see or read. By touch, contact is made with sex stimulating objects. A smell may be reminiscent or a voice may be sufficient to start the sequence of events leading to the status of penis erectus. Other conditions where this situation arises are dreams, distention of bowels and urinary bladder, distention of prostate as well as irritation from night clothes and bed clothes. The desire leads to an abnormal outlet because the urge is greater than the social, moral, and religious restraining factors built into the personality. Having reached the condition where the period of preparation is over, the course of action may be one of several according to environment, interest, habit, background and training. However, the normal healthy person never shows a reversal of the sexual instinct. This despite incidents of perversion.

NIGHTLY EMISSIONS

These occur following puberty and thereafter through early manhood. They do not occur after marriage. An engorged prostate may be the cause in a high percentage of the cases. A full bladder or a full bowel causing pressure on the prostate gland acts as an irritant. Combine this with a dream situation and an emission of prostate contents results with or without semen. There is nothing abnormal about this. The gland absorbs albumin through its walls. When it fills it becomes distended. With over-distention, irritation occurs and it empties through the only exit, the duct leading to and joining with the urethra of the penis. There is no loss of vigor, manhood or growth. There can be little or no reabsorption.

Absorption by the prostate is not reversible to any extent. Just a loss of albumin where there was an oversupply. There is of course a feeling of relaxation which quackery has called "loss of manhood." The loss of a few calories can be disregarded for there was on the average too much stored there anyway. Should it occur too often, a study of the bathroom habits, and the night and bed clothes may reveal the cause. Just as often it is due to pornographic pictures and reading or due to an evening social affair. Mentally recasting the sex significance of what has been seen, heard or read is a stimulating factor. In later years, the prostate should be emptied occasionally to prevent overdistention and hypertrophy.

MASTURBATION

This subject cannot be covered in a page, a book, or a small family library. It occurs from the cradle to the grave under a variety of circumstances. In early life and frequently through puberty and occasionally into adulthood, masturbation has no relation to sex since nothing is known of its heterosexual importance. Some dispute this statement. But in reality if there is no knowledge relating it to a sex act, it becomes simply a method of securing a favorable emotional reaction. The reaction becomes more favorable when the mental stimulus of sex knowledge is associated with the act. Under this situation it becomes a homosexual act.

Masturbation without sex knowledge is not homosexual. When the boy of 8 to 14 climbs a tree and for the first time feels the sensation of blood filled corpus cavernosa, the pounding heart beat, the tightening of the muscles of the upper thigh and finally when the source of irritation ceases, feels the relaxation and tiredness together with pale face and a sense of unreality there has been no masturbation. There has been no conscious knowledge or effort to secure sex emotional reaction. And it had nothing to do with sex. Simply because the genitalia were involved does not imply sex perversion. The genitalia are involved in priapism but sex is not always a part or cause of the reaction.

When masturbation is accompanied by mental sex image it is a homosexual act. When repeated after maturity in preference to normal sexual intercourse the individual may be said to be a homosexual. There is a fundamental difference between an incident or a number of identical incidents and a habit. An incident is unique, sudden, not prearranged or planned. The practice sometimes called "self-abuse" is frequently and mistakenly continued with the idea that it will enlarge the external genitalia. It seldom does to any great extent. The idea is usually given up where this is understood.

The treatment in all is psychologic and educational. There has been no loss of manhood or vigor and there has been no permanent mental or physical change despite misleading statements to the contrary. The physician should assure the individual on this point. This assurance will eliminate the possibility of an "inferiority" arising from the belief that it was most uncommon and affected his mental and physical health.

Masturbation is common in the Army, Navy, Merchant Marine, in camps where men are grouped

together without their families and in detention places such as jails, penitentiaries, and reformatories. A letter or thought, a mental picture with a sex interest and the period of preparation starts. If the mental picture is retained and magnified the preparatory period leads to masturbation and an orgasm. If during either the period of preparation or the period of masturbation the mental picture is completely changed, the sexual drive loses its force, the genitalia return to normal, relaxation takes place and the drive ends. Developing a wide variety of interests, mental and physical, for these groups will reduce the practice. Masturbation will occur in these environments. Put him back in society and he eliminates the practice. The act is homosexual, but he is not. The incident is forgotten.

SODOMY

As a temporary relief of a sexual drive, sodomy is practiced in preference to masturbation. This perversion is brought about by a dislike for masturbation or a feeling that a greater emotional ecstasy can be secured. It is practiced in certain countries where the female ages early due to prolific child bearing and the drudgery of excessive physical effort. The male seeks a possible substitute in the boy or young man that excites the senses. (This act is frequently but incorrectly termed onanism.)

Under conditions where groups of men are together such as in the Army post, on board ship and infrequently in dormitories, sodomy is practiced. It is more frequent where the age spread is greatest. The older ones seek out a younger male and ply him with favors. The act varies according to the desires at the time of the act. Pederasty may continue even after conditions change because of an inferiority, a deformity, or social and female ostracism.

Certain members of this group act as they do because of inability to perform normal sexual intercourse due to various physical handicaps and the physical nature of the genitalia. These handicaps are not easy to overcome. They therefore resort to this practice where the handicap becomes unimportant. Little can be done in the way of treatment except psychologic, educational and as a last resort, legal. The urning (acts similar to lesbianism, sapphism, and tribadism in the female) is however a distinct type not to be confused with the hermaphrodite.

SODOMY BY HERMAPHRODITES

The law and the physician are responsible for the complete lack of understanding about this group. The hermaphrodite early makes a decision, whether to appear in society as male or female. When he reaches maturity he is in a quandary. His first sexual experience is usually a mentally severe one. When he attempts to repeat it, he finds his position so deadening that he will not again expose himself to it. By some means he finds that a younger member of his own sex can, to some extent, gratify his sexual desires.

If discovered or reported the law is invoked in his case. He may not have known. If he does know the act is unlawful, he is still beset by his sexual desire. He must find a way out and takes the only path open to him because of the physical nature of his sexual equipment. His is a pitiful plight in court. He cannot plead for himself. Society has already turned "thumbs down." To bring attention to his deformity of birth about which he can do nothing would be to increase his misery. Relief can only come through the physician.

The physician must be on the alert to see that society does not trample on the mentally or physically abnormal members given to his care. Medical protection from legal miscarriage should be forthcoming. The insane and the leper, formerly outcasts, are being reclaimed. The hermaphrodite may be the next to claim medical attention. Very recently a western court ordered the reincarceration of such a person who was on parole for a previous offense. There was no medical testimony in his defense. Here the law for medical examination and report should be similar to that for the insane. They should however be tried "in camera" since the individual is returned to society and there should be no public branding or notoriety.

SATYRIASIS AND BESTIALITY

The frequent appearance of half-man half-animal drawings and references in ancient manuscripts can hardly be said to be without sex meaning. References to satyriasis are few but definite. Today, in parts of the world where a man is alone with cattle and sheep for long periods of time it is not unusual for this form of sexual perversion to occur.

Sensory images occur and the period of preparation of the genitalia starts. Weeks of abstinence and lack of contact with the society of people has its effect in breaking down moral barriers. The libido sexualis becomes intense (satyriasis) and bestiality (a form of sodomy) results. A fully distended prostate is a factor. The mental desire becomes great. The physical drive or tension cannot be mastered. Relief is secured by this method as a choice since masturbation is condemned by society and this form may give greater emotional reaction. The first time it is used there is far greater remorse than with other forms of perversion. Infantilism (of genitalia) is sometimes a cause due to dissatisfaction with normal sexual relationships.

Under similar environment the practice is repeated. This is probably from necessity, not from choice. It may be repeated several times during an

extended period. Perversion, yet, from necessity. If in the last analysis it becomes perversion by choice then we may call him a pervert. Certainly not until then. Weak in succumbing, yes. Seldom if ever does an individual continue the practice upon returning to a normal social environment.

SEX SENILITY

A certain percentage of males over seventy attempt to stimulate sexual response by giving attention to younger females. This is abnormal only in the sense of age. There is an overemphasis to secure response of the genitalia. The attempts continue with but little more than a partial emotional satisfaction and a feeling of disgust on the part of relatives and friends. Early education before the situation arises gives favorable results in some cases. Occasional priapism confuses the aging male somewhat but here again instruction as to its relief by urination or bowel movement is sufficient. But you cannot educate the senile. The fixed idea remains and the practice is continued out of sight of the critics.

RAPE

While the homosexual does not commit rape, and the murder that frequently accompanies it, the normal occasionally do, the degenerate and the sexual despondent frequently do. When the normal male marries a woman who, unknown to him, is for a number of reasons or only one, opposed to sexual intercourse a problem arises. The period of forced abstinence will usually be short. The results cannot be predicted, if the sexual drive is strong. Adultery and rape are two possibilities.

The sexually despondent knows of and may resort to masturbation. But if through various sources of information he finds that masturbation is frowned upon by society and he is further told it is sapping his manhood, he seeks another outlet said to be more satisfying. The result is frequently rape. Here again sound psychology and education is the treatment that will re-establish the sexually frustrated and despondent as a normal member of society. The sexual degenerate can seldom if ever be helped. He repeats on parole. He should remain permanently removed from society.

SUMMARY

1. In the vast majority of sex perversions the individual is neither a sex pervert nor a sexual psychopath.

2. Masturbation is not necessarily a sex act. Nor does its temporary practice make a pervert. Masturbation and other temporary sex perversions do not sap the vitality, cause any loss of manhood, or cause any known mental or physical degeneration in the normal male. No stigma need be attached to the act.

3. Where males are isolated many abnormal sex perversions can be eliminated by vocational and recreational activities and by sex education.

4. All legal cases involving sex perversion should have medical screening to determine if of hermaphrodite or psychopathic origin.

(The Bettmann Archive)

The great heat-wave of July 11-20, 1878, in St. Louis, Missouri. Officers bringing victims of sunstroke to the City Dispensary for medical treatment. Woodcut.

Diagnostic Clinic

The Treatment of Status Asthmaticus

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STATUS asthmaticus is the major emergency among allergic diseases. Any patient with asthma is a possible candidate for this complication, which can prove fatal. Therefore it deserves the attention of the general practitioner in the province of whose experience it most commonly begins.

PATHOLOGY AND DIAGNOSIS

Status asthmaticus is not just a severe attack of asthma, but a specific complication of asthma, with characteristic pathologic changes and a recognizable clinical picture. It is usually touched off by an acute respiratory infection, although an existing chronic bronchitis may flare up in the wake of exposure, fatigue, and physical or nervous strain. The resultant acute bronchitis is manifested by sputum that is not only purulent but more viscid. The viscid nature of the sputum greatly increases the patient's trouble in raising it. It also blocks small bronchioles, giving rise to little areas of atelectasis. (One must remember how quickly a whole lung whose bronchus is completely blocked becomes airless: *within twenty minutes.*) Some of these atelectatic areas, becoming infected, are now the site of a pneumonitis.

The clinical picture is in keeping with these lesions. What began as an ordinary attack of asthma becomes rapidly worse, with fever, leukocytosis, and scant, viscid, usually purulent sputum. The most characteristic and ominous sign is the failure of epinephrine to give any or more than momentary relief. Cyanosis is the first evidence of anoxemia that may go on to asphyxia.

Status asthmaticus usually develops in the patient's own home, when a neglected cold finally puts him there. Here matters are often made worse by increased exposure to the things to which he may be sensitive, especially house dust. Sometimes atmospheric conditions play a part: humid, depressing weather, fog, and smoke. (It was chronic asthmatics and cardiac patients verging on decompensation that were stricken by the deadly three-day combination of fog and smoke smog, at Donora, Pa., last year.) Occasionally the precipitating factor is any one of the currently available antihistaminic drugs. They all have more or less of an atropine-like action that lessens bronchial secretion and can tip the scale against the patient.

PROPHYLAXIS

The best treatment for status asthmaticus is prevention. This calls for the complete study and treatment of every asthmatic. Look out for the patient with mild constant trouble that remains after a partial diagnosis, inadequate management, or treatment only partly successful; a "little" asthma that he has learned to live with. He is always a potential candidate for worse trouble. Such a patient should guard against respiratory infection by proper rest, proper protection against weather and exposure, and the prophylactic use of vaccines, autogenous or

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stock, to lessen the threat of complication of a common cold. If he gets a cold, he should show it proper respect and take time out to get over it promptly.

RICHARD A. KERN

TREATMENT

The first indication in the treatment of status asthmaticus is immediate hospitalization, because in the hospital things can and must be done for the patient that can't be done at home. It also gets him away from a possibly unfavorable environment, including the many things that make up his own house dust.

However, in making the arrangements for hospitalization, the doctor must be sure that a proper environment in the hospital is prepared to receive the patient. He must be in a room alone, not in a ward or semi-private room. Bedding must be in keeping with the patient's known allergic pattern. To be on the safe side, the best plan is to have foam rubber pillows and mattress. The nonallergic pillow is a "must," but a plastic casing over another mattress is acceptable. A feather pillow inside such a casing is *not* acceptable. Cotton or woolen blankets covered with cotton sheets are in order. There should be no rug, no upholstered furniture, and no flowers. Avoid a freshly painted room and use no insecticidal spray at any time. A room provided with filtered air is the ideal one, but an oxygen tent provides clean, although expensive, air.

Relief of asphyxia is paramount. Oxygen may be given by mask, intranasal catheter, or tent. The mask is simplest, least terrifying to the patient, and leaves him more accessible for examination and treatment. The oxygen tent, however, is wholly pollen-free and may be made necessary by reason of its availability or by lack of cooperation by the patient.

Administration of oxygen by means of a tent, however, usually benefits only the family and the doctor; it is useless to the patient because of errors in technic. From time to time I have checked the oxygen content of tents in routine use in different hospitals and, regardless of the rate of delivery from the tank, I have found as many as 23 of 25 tents sampled to contain less than 30 per cent of oxygen. Yet the desirable level is 38 to 40 per cent and for short intervals it should be up to 50 or 60 per cent. Do you know how much oxygen *your* patients are getting? There is only one way to find out: frequent analysis. Fortunately this can be done quickly (two or three minutes) and without an expensive chemical process. The apparatus is simple, convenient, and easy to use by any nurse or attendant.

Oxygen in helium has proved useful for these patients. The standard proportion in the tanks supplied is 20 per cent oxygen and 80 per cent helium. Because of its light atomic weight (4) as compared with nitrogen (14), the helium is breathed with as little as one-seventh the effort that ordinary air requires. For reasons of economy the mixture is best given in a tent.

Since asphyxia may be due to accumulated and viscid secretions, bronchoscopy is a most valuable and at times a lifesaving procedure. When the patient is cyanotic and obviously unable to cough up his sputum, bronchoscopy should promptly be performed. I have had it done on a patient sitting almost upright in a wheelchair while the bronchoscopist stood on a stool behind the patient. Administration of 0.5 cc. of epinephrine a minute before the bronchoscope is passed or even while it is in situ will stimulate the secretion of a thinner mucus that

can be more readily aspirated. During the whole procedure 100 per cent oxygen can be given through the bronchoscope. The measure can be repeated as needed.

Rest, which the patient so desperately needs, is best achieved by the induction of surgical anesthesia. It relaxes bronchial spasm and gives real rest to a patient who hasn't slept for days. Various anesthetics have been used, including avertin, ether, cyclopropane, and barbiturates.

Ether by bowel is safe and produces an anesthesia that lasts long enough. Equal parts of ether and olive oil are mixed with an egg beater. The dose is 150 to 200 cc. of the mixture for an adult and 100 cc. for a 12-year-old child. It is given slowly, a dram or two at a time, into the cleansed bowel, taking twenty minutes to give the whole dose. A disadvantage of ether is that it is eliminated through the lungs and causes irritation in the bronchial tree.

Avertin is nonirritating and easier to give, but has a lesser margin of safety. Yet I have seen no ill effects from its use. The dose is 60 to 80 mg. per kilogram of body weight. Avertin is my first choice, ether my second. I have had no experience with cyclopropane, and I would discourage the use of barbiturates for anesthesia. Barbiturates and chloral hydrate in the ordinary sedative doses are useless.

THE first time an anesthetist is asked to induce deep surgical anesthesia in a patient gasping for breath, cyanotic, with a rapid pulse, a moist skin, and perhaps mentally dull, he expresses sharp misgivings as to the advisability of the procedure. He may try to use a smaller dose (which will do no good) or he asks you to assume the responsibility. Yet in a few minutes after the induction of anesthesia and while oxygen is being given, the patient's breathing becomes quiet, the color improves, the pulse slows, and the patient is calmly asleep. He awakens in four to eight hours refreshed, rested, and may even be over the attack. I have repeated the procedure as often as three nights in succession.

Wet lungs, as indicated by many moist and bubbly râles, are occasionally seen. This calls for venesection. An old principle that the phlebotomists knew still applies: that 250 cc. removed rapidly will do more good than 500 cc. removed slowly. Hypertonic glucose solution given intravenously (50 to 100 cc. of a 25 per cent solution, or 25 to 50 cc. of a 50 per cent solution) is also helpful in such cases by withdrawing fluid from the lungs into the blood stream. Hypertonic sucrose solution, formerly so used, should not be given, because it may seriously damage the kidneys.

Much oftener the patient is actually dehydrated and starved as a result of his inability during several days to eat and drink enough. If a stat blood sugar estimation shows a figure of less than 80 mg. per 100 cc., the patient should be given 1000 cc. of a 5 per cent glucose solution by slow intravenous drip (40 drops a minute). He should not be given salt solution as a rule, lest it increase edema of the bronchial mucosa. The total fluid intake should be between 2 and 2.5 liters a day. Intravenous administration is stopped when the oral intake is adequate.

The term "epinephrine-fast" is often used in these cases because of the short duration of the action of the drug when given by the usual route. Nevertheless, epinephrine may be given to advantage to these patients intravenously in the glucose infusion: 2 cc. of 1:1000 epinephrine in the first 60 cc. of infusion that take thirty minutes to run in ("a minim a minute"). Thereafter the rate of epinephrine administration should be only half as fast (a minim in two minutes). Or the epinephrine may be given directly by injection into the vein through a needle inserted and held in place. The injection is then given at the rate of a minim a minute and never more than one minim at a time.

Aminophylline may work when epinephrine fails. It is most effective when given intravenously. It must be given slowly, because it may, especially if given too fast, produce circulatory collapse. The contents of 1 ampule, containing 0.5 gm. in 2 cc. of solvent, are diluted to 10 cc. with physiologic saline solution and then injected evenly over a period of twenty minutes. For children the dose is 0.006 gm. per kilogram of body weight. In less severe cases, or when the attack is beginning to yield, the aminophylline may be given rectally, either in a suppository, or 0.5 gm. dissolved in 30 cc. of tap water. Intravenous doses may be repeated at six- or even four-hour intervals.

Papaverine relaxes smooth-muscle spasm but does not depress the cough reflex or the respiratory center to any appreciable degree. It can therefore be given hypodermatically or even intravenously. *But you must know before hand that the patient is not sensitive to opium or its*

derivatives. Ignorance on that point contraindicates the use of this drug.

THE fact that infection plays an important role in status asthmaticus naturally suggests the use of chemotherapy and antibiotic therapy. In arriving at a proper selection of such treatment, at least three factors call for consideration and evaluation. Most insistent is the seriousness of the patient's condition which demands prompt treatment. Then there is the question of the types of organisms involved and their relative susceptibility to the various drugs available. We must know, too, whether the patient has a proved sensitivity to the drugs in question.

Penicillin is the most generally useful of the medicaments to be considered here. On mere probability it is more likely to be effective than are other drugs against the organisms commonly encountered. Patients are less frequently sensitive to penicillin than to other antibiotics or chemotherapeutic agents, and the sensitivity to penicillin is usually not serious in degree or manifestation.

The use of penicillin can therefore be started promptly in most cases as a routine, *but not before a suitable specimen has been delivered to the laboratory for culture of bacteria and determination of their drug susceptibilities*. It may be given in one or more of these ways: a daily dose of 300,000 units of a slow-acting preparation (but not penicillin in beeswax: allergic reactions to beeswax are far more common and more severe in asthmatics than in nonallergic individuals); a dose of 50,000 units every three hours until relief is in sight; the inhalation of 50,000 units in 1 cc. of solvent, together with 3 or 4 drops of glycerin, by means of a suitable nebulizer. The last calls for more cooperation by the patient than is usually possible at the outset.

If the laboratory reports that the bacteria in the sputum are penicillin-resistant but sensitive to another drug, the medication is changed accordingly. Obviously, if the patient is known to be sensitive to penicillin or to any other of the antibiotics or the bacteriostatic drugs, then those drugs to which sensitivity exists are not used.

It is well to inquire about previous medication along these lines. It is the rule, rather than the exception, that these patients in the past have been given various antibiotic and bacteriostatic drugs. Even though no untoward effect was experienced at that time, the readministration of the drug may be followed promptly by signs of the sensitivity that has developed as a result of its prior use.

Do not use antihistaminic drugs in status asthmaticus. Their atropine-like effect in reducing and inspissating bronchial secretion only makes a bad matter worse. They are responsible for the development of status asthmaticus through this action, and they could effect a fatal outcome.

Morphine, pantopon, dilaudid, codeine, and other opiates should never be used in status asthmaticus. The opiates are the commonest cause of death in asthma. By slowing the respiratory rate and depressing the cough reflex, they can quickly induce a fatal asphyxia. I have known a ¼ gr. dose of codeine to kill a patient within thirty minutes. There should be a standing rule in hospitals that forbids an intern or resident to give an opiate to any asthmatic patient until after consultation with his chief. Morphine in tiny doses (1/24 gr.) may at times be given to advantage in an occasional attack of asthma, with proper respect for the danger of habituation, but no opiate should ever be given to a patient actually in status asthmaticus.

Improvement in an attack of status asthmaticus is heralded by the better and more lasting effect of epinephrine, increased quantity of a thinner sputum, and subsidence of fever. The change may come with dramatic speed: a patient seemingly moribund on admission is ready to walk out in comfort within a couple of days.

In fact, the patient who may have had a little asthma all the time for weeks and months before his attack of status asthmaticus is quite free of all symptoms immediately after the attack and may remain free for weeks and months thereafter. The degree and duration of relief are to a considerable extent proportional to the amount of fever which the patient had during his attack of status asthmaticus.

This fact is the basis for a type of treatment used in less severe but persistent cases of asthma: so-called nonspecific protein shock therapy. I have even used it in cases on the verge of or in beginning status asthmaticus. By the intravenous injection of an agent such as typhoid vaccine there is produced a sharp rise of fever lasting usually several hours and attended by a stimulation of immunity that overcomes for the time being the existing chronic or subacute bronchial infection and temporarily even ter-

minates the asthma. The initial dose of vaccine is 10 to 25 million typhoid bacilli. The procedure may be repeated for as many as a total of 3 or 4 doses. An interval of five days must be allowed between injections, and the dose of vaccine usually has to be doubled or even further increased to insure a fever that ought to rise to between 102° and 104° F. for the best results.

Such nonspecific fever therapy must never be substituted for specific treatment. It should be reserved for those patients in whom our studies have failed to uncover all avoidable causes; patients who, in spite of all we have been able to do along allergic lines and in the surgical correction of nasal and sinus disease, still continue to have chronic symptoms. For them such fever therapy may be the turning point that starts them on the road to recovery, if we then follow through.

The follow-through is precisely what the patient needs who has just survived an attack of status asthmaticus. It is our golden opportunity to re-study his case thoroughly and completely. He should be handled as if he were a brand new patient in whom we start from scratch to find out why he has asthma and what complications of asthma exist in his case. Our efforts will often be rewarded by finding factors hitherto unsuspected, the attention to which will secure for the patient complete and lasting relief.

SUMMARY

THE most important points with regard to status asthmaticus are these:

1. Status asthmaticus is the major emergency among allergic diseases that oftener than any other factor may lead to the death of an asthmatic patient.

2. Immediate hospitalization is indicated to get the patient out of an unfavorable environment into one that is favorable because it has been so prearranged.

3. Relief of asphyxia is the first objective and is accomplished by proper administration of oxygen, or oxygen in helium.

4. Since asphyxia may be due to inspissated secretions that the patient is unable to get rid of, bronchoscopy must promptly be used, since it alone may save the day.

5. Rest is best achieved by the induction of surgical anesthesia with avertin or ether by bowel.

6. Starvation is offset by intravenous glucose solution that usually calls for 5 per cent strength to meet existing dehydration, but that occasionally is given in concentrated solution to relieve pulmonary edema.

7. Epinephrine, although of little use by the usual routes of administration, may be helpful when given intravenously by constant drip at an initial rate of not more than one minim a minute.

8. Aminophylline may work when epinephrine fails. It must be given very slowly to avoid circulatory collapse.

9. Penicillin is generally the most applicable drug to combat infection. Other antibiotics or bacteriostatics are invoked in the light of tested susceptibility of the bacteria in the patient's sputum and in the light of existing allergy to these drugs.

10. Opiates and antihistaminics should never be given to patients in status asthmaticus, lest fatal asphyxia ensue.

11. The best treatment for status asthmaticus is its prevention by complete diagnosis and thorough treatment of asthma and its complications, especially by never being satisfied in any case with anything less than complete and lasting relief.

GENERAL PRACTICE *Review*

To provide the general practitioner, as well as the specialist with concise, readily available information on the latest, proved methods of treatment of conditions commonly encountered in an average practice, POSTGRADUATE MEDICINE *offers this department to its readers. It is not, of course, intended to present these discussions as the only acceptable therapeutic procedures to be used, but rather to offer simple regimens and recommendations based on the extensive experience of the physicians who prepared these summaries.*

Emergency Treatment of Chemical Burns of the Eye

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With the great increase in the use of chemicals in industry there has been an increase in the percentage of eye injuries due to these substances. The first aid treatment these patients receive often is an important factor in determining the ultimate visual acuity.

Regardless of the chemical, **the first procedure** in the event of any injury is the **copious lavage of the eye with water.** There are specially designed fountains that are ideal for this purpose but these are not always available so that any source of water, such as "dunking the injured man's head in a pail of water and forcing his eyes open" is satisfactory. After this has been done as thoroughly as the facilities permit the patient is to be sent to a physician for further treatment.

Because of the pain and spasm it is necessary to anesthetize the eye by gently allowing some form of local anesthetic to enter the cul-de-sac. Pontocaine is preferred because of its very rapid action. Once the pain and spasm have been relieved the eye can be inspected, the conjunctiva cleaned and the folds thoroughly washed out by copious irrigation with any clean nonirritating solution such as water, normal saline, or 1 per cent boric acid. This constant irrigation should be continued for ten to fifteen minutes. In injuries caused by exposure to solid chemical substances such as plaster, sulfur, concrete, or lime, care must be taken that no particles remain under the upper lid or in the edematous folds of the conjunctiva.

After the initial copious lavage and cleansing of the eye, further attention can be given to the causative agent.

Alkali burns penetrate and soften the tissues wherever they reach so that deep penetration usually occurs. The prognosis must be guarded as the extent of the damage usually can not be determined for a period of several weeks. Most authorities agree that the use of 0.5 per cent acetic acid solution used freely in the conjunctival sac seems to help healing.

Although **acid burns** appear at first glance to be serious, they are never as bad as the alkali burns. As soon as the acid enters the eye it precipitates the protein of the conjunctiva and cornea and this prevents further penetration of the acid into the tissues. After removing free acid by irrigation little help is to be expected by further neutralization.

In **lime burns** lavage with a freshly prepared solution of neutral 5 per cent ammonium tartrate is indicated several times a day for a period of a week. Its action is to remove the newly formed soluble calcium tartrate and thus reduce the scarring to a minimum.

The new refrigerants **dichlordifluor-methane (F12)** and **dichlor-tetra-fluor-ethane (F114)** are not soluble in water, but miscible in oil. Hence in injuries caused by these substances repeated instillations of olive oil are usually advised.

As stated previously, however, the most important treatment of a chemical injury to the eye is the immediate copious lavage of the eye with large quantities of water.

Minor Procedures in Fracture Management

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In the course of time every clinic develops or adapts certain minor technics which make patients more comfortable and lessen disability both in time and degree. In the Fracture Clinic of the Peter Bent Brigham Hospital the following procedures have been particularly useful. They have stood the test of time and usage in the hands of many interns and residents and also in office practice.

BASEBALL FINGER

The so-called "softball" is a common cause of avulsion of the extensor tendon of the distal phalanx of the middle or ring finger. The distal phalanx cannot be extended beyond approximately 150 degrees. Occasionally a tiny chip of bone is avulsed with the tendon from the extensor aspect of the distal phalanx. If untreated, the deformity is at best a nuisance and in musicians, typists, and others who do handwork it can be a serious disability.

The distal phalanx is extended by tendons which pass along the lateral sides of the finger from the lumbricales and interossei. The position of greatest relaxation for this tendon system is that of maximum flexion of the proximal interphalangeal joint and maximum extension of the distal interphalangeal joint.[1] Immobilization in this position can be achieved by slipping the finger into a tube of stiff, dry "fixed" plaster of paris bandage about five layers in thickness.[2] The finger is then dipped into water and is held by the patient on a flat surface as shown in Figure 1 until the plaster has set.

Immobilization must be maintained for at least four weeks. During this time a change of cast is almost always necessary. When the cast is changed no motion of the phalanx should be permitted lest the fragile fibrous tissue at the site of injury be avulsed again.

FRACTURE OF THE DISTAL PHALANX OF THE GREAT TOE

This is almost invariably the result of a heavy weight falling against the toenail. As a rule, the nail remains intact and the force of the blow is absorbed by the underlying phalanx and flexor pad. Frequently the fracture is comminuted, involving the interphalangeal joint, but only rarely are the fragments significantly displaced. Immediate pain can often be relieved by drainage of the accompanying subungual hematoma through a hole in the nail or, more often, by its removal, but discomfort on motion remains.

After a thorough soap and water scrubbing and skin disinfection, wheals (2 per cent procaine solution) are raised on both sides of the extensor surface of the proximal phalanx. A needle is introduced through each wheal along the side of the phalanx to its flexor surface and 2 to 3 cc. of the solution injected. If the resulting anesthesia is inadequate further infiltration can be carried out along the base and sides of the nail. The nail is seized with a Kocher clamp and gently rolled and pulled from its bed. The bed is dressed with three layers of petrolatum gauze and three layers of dry sterile gauze.

The ideal splint should immobilize the distal phalanx and interphalangeal joint, should lie on the extensor surface of the toe, and should be thin enough to allow the patient to wear a shoe. These requirements are met by certain plastics used by the dental profession which become soft and are easily moulded at temperatures well below the point of danger to the skin.*

A piece of the plastic is immersed in hot water until quite soft and is moulded over the extensor surface, the edges of the nail, and end of the toe. "Setting" is almost immediate. The splint is then removed and trimmed with scissors to the shape illustrated in Figure 2. Splintering during trimming can be avoided by slight rewarming of the plastic by dipping in hot water. Care is taken to keep the proximal end of the splint about a centimeter distal to the metatarsal phalangeal joint to prevent pinching in extension.

The completed splint is padded with two layers of sheet wadding and is fastened in place with strips of elastic adhesive tape. Nonelastic tape tends to constrict on motion of the metatarsal phalangeal joint and does not "give" in the event of further swelling.

Relief of pain and discomfort is often dramatic and patients are able to return to work on the day of injury.

THE CLAVICULAR FIGURE-8 SPLINT

Many fractures of the clavicle require no reduction or can easily be reduced after novocain in-

*PERFECTION IMPRESSION COMPOUND, Kerr Manufacturing Company, Detroit, Michigan. TRAIL BASE, S. S. White Dental Manufacturing Company, Philadelphia, Pennsylvania.

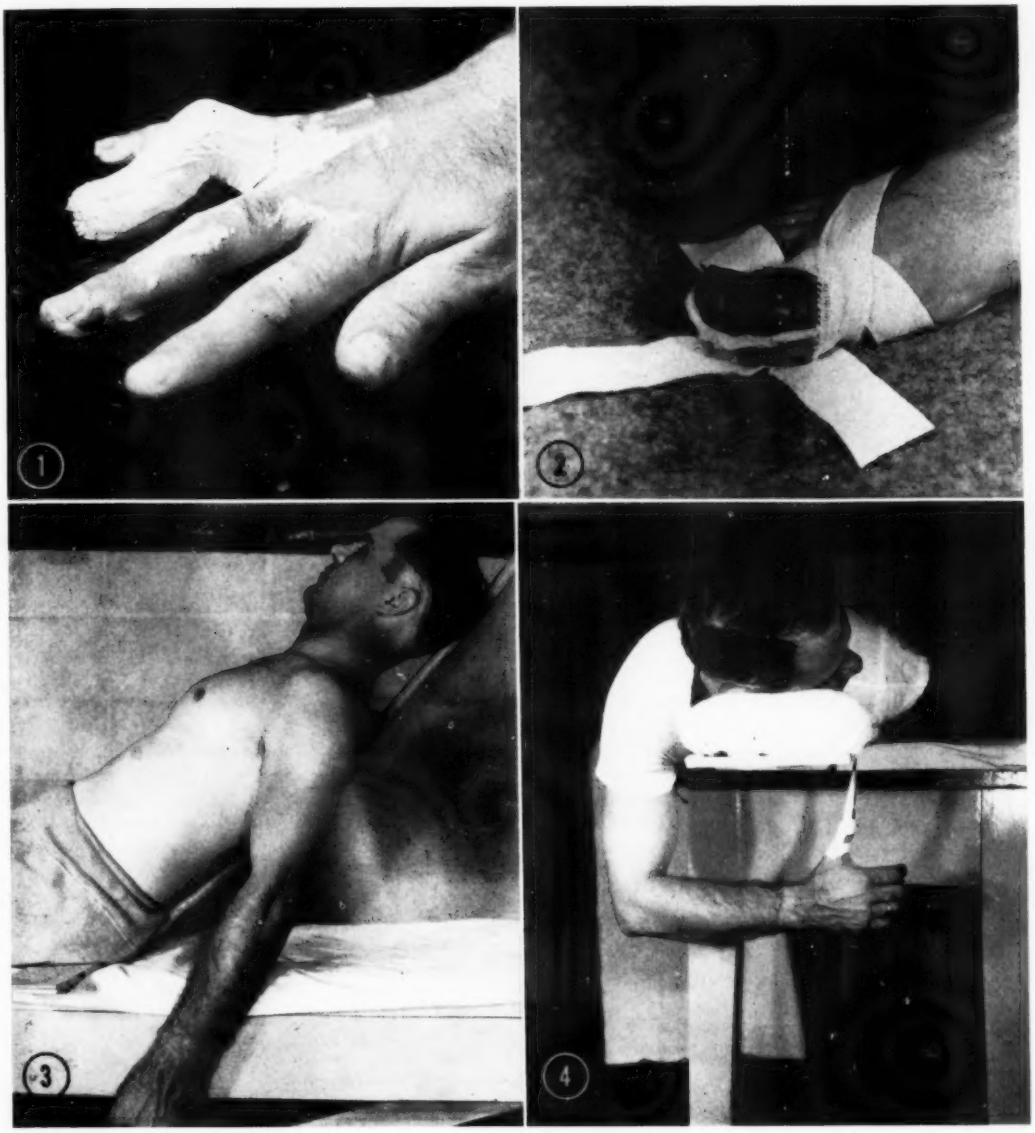


FIGURE 1. Plaster immobilization for "baseball finger." The distal interphalangeal joint is in hyperextension and the proximal in flexion.

FIGURE 2. Plastic splint and padding in place for fracture of the distal phalanx of the great toe. One strip of elastic adhesive tape has been applied to the proximal end. Two other strips are in position for application.

FIGURE 3. Patient lying against broomstick in position for application of clavicular figure-8 plaster splint.

FIGURE 4. Patient in position for application of a hanging cast.

filtration of the fracture site and can be treated with a plaster of paris Figure-8 splint.

Reduction of the fracture and application of plaster can be facilitated by the use of a broomstick.[3] A table is placed with one end against a wall. The patient sits on the table with his back to the wall and with a piece of ¾-inch plank beneath his buttocks. The broomstick is laid between the wall and the edge of the plank at an angle of 35 to 45 degrees from the horizontal. A felt pad is placed against the dorsal spine and the patient lies with his vertebral column against the broomstick and the arms hanging on either side of the table (Figure 3). If necessary, reduction can be facilitated by manipulation of the fragments with towel clips. Two thicknesses of sheet wadding are applied and the Figure-8 splint is made with four or five rolls of 4-inch plaster of paris.

Care is taken to avoid building up plaster between the thorax and the arm. Plaster is moulded against the thorax rather than up into the axilla. Before setting has occurred the broomstick is withdrawn and is replaced outside the plaster until it becomes hard. Moulding of the shoulder girdle outward and backward is automatic.

THE HANGING CAST

A considerable number of fractures of the humerus, particularly those of its upper end, require no reduction and can be treated by gentle traction in the so-called hanging cast. A simple method of applying this cast is shown in Figure 4.[3]

The patient lies prone with the corner of a table at the midpectoral region. A board such as an ironing board lies between the patient and the table and supports the head. One-inch adhesive tape is wrapped around the thumb and carried up to the table or the projecting board to support the arm with the elbow flexed at 90 degrees and the forearm in midrotation. The surgeon sits on a low stool or on the floor and applies the cast from the proximal palmar flexion crease to the axilla. A small wire loop is incorporated into the cast in line with the shaft of the humerus. This loop is used for the maintenance of traction at night.

The patient sleeps with the head of the bed elevated about 30 degrees from the horizontal and the cast is supported on pillows. A light clothesline is attached to the wire loop, carried through a small pulley at the foot of the bed and tied to a weight of from five to seven pounds. The ordinary household electric iron or common brick weighs approximately four pounds.

"SPRAIN" OF THE WRIST AND FRACTURE OF THE CARPAL SCAPHOID

Sprain of the wrist is a diagnosis which can be made only when fracture of a carpal bone, particularly the scaphoid, has been ruled out. Fracture of the carpal scaphoid characteristically occurs from a fall on the outstretched arm and hand. The typical triad of signs is: (1) tenderness and sometimes edema in the anatomic snuff box; (2) pain referred to the radial side of the wrist on manipulation, and (3) pain on the radial side of the wrist on percussion of the distal end of the index metacarpal with the metacarpal phalangeal joint flexed and the shaft of the metacarpal aligned with the radius.

At least four x-ray views of the wrist should be taken. If no fracture is seen in any view, even with a magnifying glass, but the patient presents the characteristic symptoms and signs, the wrist should be immobilized for two weeks. The cast should then be removed and a second set of x-rays taken. Often this second x-ray study will reveal a previously invisible fracture line because of bone absorption at the fracture faces. Plaster can then be replaced and check films taken at six-week intervals.

For the typical common fracture through the waist of the bone, union as a rule requires from twelve to sixteen weeks of immobilization.

Plaster is applied with the patient sitting opposite the surgeon at a table. The forearm is held vertical with the wrist in 30 to 45 degrees of extension (dorsiflexion) and with the index finger and forearm opposing each other. It is convenient to ask the patient to hold a pencil as the plaster is being applied.

Stockinette is fitted from the elbow to the distal joint of the thumb. The stockinette between the thumb and index finger is cut down and fastened together with adhesive tape to form a mitten. Slabs of four thicknesses of plaster are applied on the flexor and extensor surfaces of the forearm from the distal palmar crease to the elbow and are held in place with circular turns of plaster bandage. Stockinette is turned back and covered with a final turn.

The completed cast does not extend on the thumb beyond the metacarpal phalangeal joint. As it sets, the plaster is very carefully moulded to fit snugly into the palm and about the wrist (Figure 5).

ASPIRATION OF THE ELBOW JOINT

Many fractures of the head of the radius present little or no displacement but are accompanied by considerable pain and marked limitation of motion. Aspiration of fluid from the joint often results in dramatic relief of pain and return of motion.[4] The procedure is not difficult. With the forearm pronated and after infiltration with novocain, a 16-gauge needle is introduced into the joint through the center of the triangle formed by the head of the radius, the tip of the olecranon, and the lateral condyle of the humerus (Figure 6). As much as 23 cc. of bloody fluid has been recovered but the

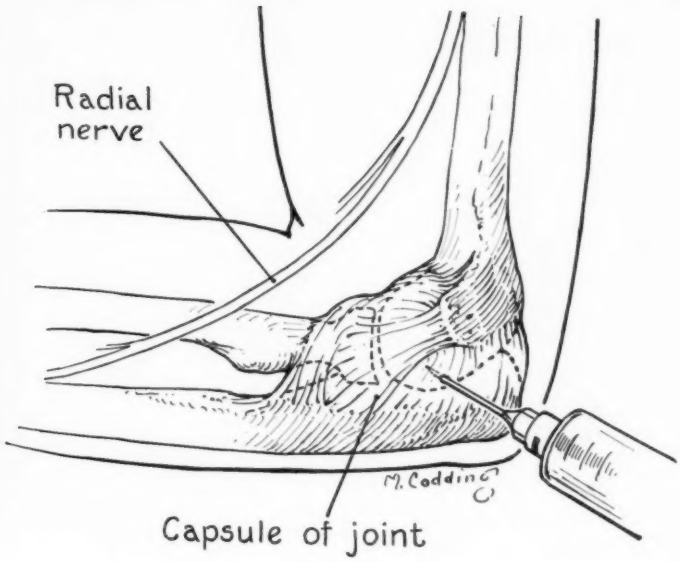
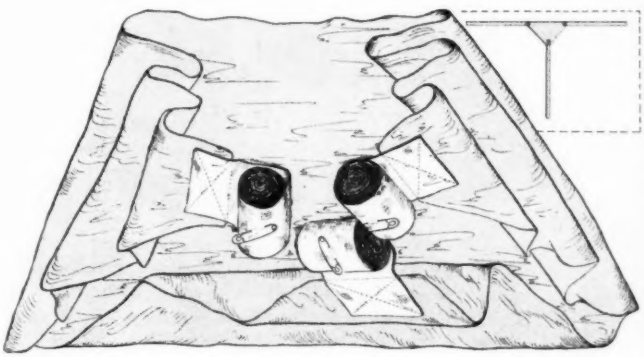


FIGURE 5 *(left)*. Plaster cast for immobilization of the carpal scaphoid. The patient is able to hold a pencil and write.

FIGURE 6 *(right)*. Aspiration of the elbow joint. With the forearm pronated, after infiltration with procaine, a 16-gauge needle is introduced into the center of the triangle formed by the head of the radius, the lateral condyle of the humerus, and the tip of the olecranon. (Reprinted from *The New England Journal of Medicine,* 240:915-23).

FIGURE 7 *(below)*. The three-tailed triangular bandage. Four inch elastic cotton bandages are sewed to each corner as shown in the insert.

FIGURE 8 *(right)*. The three-tailed triangular bandage in place.



removal of as little as 5 cc. is well worthwhile since the normal content of the adult elbow joint is less than 1 cc.

Aspiration is not a substitute for arthrotomy in the treatment of fracture of the head of the radius, but is often useful in clarifying the indications for operation in doubtful cases.

Even though the aspiration of fluid from a joint is a minor procedure it should be carried out only in a clean operating room with rubber gloves after a meticulous skin disinfection.

THREE-TAILED TRIANGULAR BANDAGE

For many injuries of the shoulder girdle and arm, immobilization with a swathe of the Lund or Velpeau type is indicated. However, the application of these classic bandages seems to be a disappearing art since the once familiar rolls of folded muslin are less and less in evidence in outpatient departments and offices. A simple bandage which once seen can be applied by any student nurse will often accomplish as much as any swathe.[5]

The ends of cotton elastic bandages 4 inches in width are sewed to each corner of a standard triangular bandage made from a 36-inch square of muslin. The bandages are kept from unrolling by safety pins in each (Figure 7). The sling is fitted in the usual fashion with the right angle projecting beyond the elbow and the other ends crossing behind the neck. The bandages are then unpinned and rolled around the thorax and across each other to their full lengths. The three safety pins and others if necessary are placed at strategic points to prevent slipping (Figure 8). A powdered pad in the axilla is appreciated in hot weather.

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Treatment of Eczema

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What is eczema? There have been attempts to eliminate eczema from the medical vocabulary, but like rheumatism it seems entrenched as a household word. To the lay mind it is an awesome and treatment-resistant disease of the skin; to the practitioner it is a convenient label for an itching, cutaneous eruption of doubtful origin, while to the dermatologist it is a symptom complex which at some time in its course is characterized by vesiculation and oozing.

Every eczema is a dermatitis, but the converse is not true. Dermatitis, a much broader term, is an inflammation of the skin due to internal or external causes, the result of contact, ingestion, inhalation, injection, instillation, or other methods of absorption. It is characterized by erythema, edema, papules, and vesicles; it may progress to simple scaling and desquamation, or it may first become oozing and crusted and then desquamate; it may become secondarily infected with the formation of pustules or persist as an infiltrated, excoriated, lichenified eruption rebellious to treatment. Clinically it may present any one or any combination of these lesions. Confusion has arisen from the use of the terms eczema and dermatitis as if they were distinct entities. This has been further increased by qualifying the terms according to morphology, topography, etiology, and predisposing factors.

For many years the majority of writers considered all eczemas as nutritional in origin, but it has been recently established that most eczemas are caused by external factors. Most eczemas are dermatitides due to external factors.

The external causes of dermatitis are either primary irritants or sensitizers. Primary irritants are substances which will cause a disturbance of the skin in the majority of the people. These causes are easy to detect, and once removed the eruption needs very little treatment other than a soothing lotion or ointment.

The sensitizers, however, are substances that are normally innocuous and produce the so-called sensitization dermatitis, commonly known as eczema, contact dermatitis or eczema, allergic dermatitis or eczema. In this type of eruption there is an initial exposure without resulting lesions, but subsequent exposure, even to minimal quantities, may result in a reaction which is manifested either at the localized site of contact or as a generalized process. In this group the causative factor is dif-

ficult to determine because of the long incubation period between the initial exposure and the subsequent eruption. However, in order to produce a cure, it is necessary to remove the factor causing the eruption. It is in this group of cases that history-taking is most important. Careful study of the patient will narrow down the possible offenders and frequently the use of patch tests will expose the culprit.

With the cause determined and eliminated, **treatment consists essentially of local therapy,** which must be adapted to the type of eruption present at the time of examination. Internal treatment for the most part is of little or no value. Occasionally the use of antihistamines seems to check the progress of the disease and relieve itching. However, one cannot be sure that these are accomplishing this relief, for prior to their introduction suitable local therapy alone produced similar results.

WET DRESSINGS

The onset of an eczema is generally characterized by erythema, edema, and vesiculation. At this stage wet dressings are indicated. Two per cent boric acid solution, one tablespoon of a solution of aluminum acetate to a pint of water, or boiled milk make very soothing dressings. These must be kept continually wet and protected by an imperviable covering. They should be very generous in bulk and changed frequently, for if allowed to dry they become irritating.

The same solutions may be used as sponge baths for the first few days, for soap and water are contraindicated. However, if the eruption becomes very extensive and the patient is uncomfortable because of lack of bathing, then the following baths should be prescribed.

BATHS

Starch—Use sufficient cold water to dissolve one-half box of cornstarch. To this solution add one quart of boiling water. Pour this mixture into the bathtub one-half full of warm water. The patient should remain in this bath about ten minutes.

Colloid—Pour one quart of boiling water over two cups of oatmeal. Cook on the stove until a thick porridge is formed. Fill the bathtub half full of warm water; dissolve one teacup of baking soda in the tub of water. Pour the porridge into a cheese-cloth bag and tie it securely. Swish this porridge bag around in the tub of soda water until the water is milky. Stay in the bath fifteen minutes; dry the body using a patting motion.

Bran—Prepare a cheese-cloth bag containing one-half to one pound of bran. In filling the tub allow very hot water to run over and turn this bag, and then complete filling the tub with water at suitable temperature. Squeeze the bag occasionally and use as a washcloth.

LOTIONS

With relief of the edema, treatment with a bland lotion should be instituted. I prefer Calamine Lotion, U.S.P. XIII, to which 1 per cent phenol may be added for itching, or the following prescription:

Phenol	1
Prepared Calamine	15
Magma of Bentonite	40
Water	q.s. 100

If this preparation is to be used on exposed areas, a small amount of neocalamine might be added to produce a natural skin color to the lotion. If there is marked itching, ½ or 1 per cent menthol or 2 per cent solution of coal tar may be added to the above prescription.

These lotions are very drying and should be followed by use of both the lotion and a paste, such as

Zinc oxide	2
Cornstarch	13
Petrolatum	q.s. 30

EMULSION

If the eruption is extensive, with the edema removed an emulsion might be much easier to apply and is frequently more soothing. It may be applied directly to the skin. Such an emulsion is found in Calamine Liniment N.F. (as follows):

Prepared Calamine	8
Zinc oxide	8
Olive oil	50
Solution of calcium hydroxide	q.s. 100

A small amount of ½ of 1 per cent phenol or ¼ per cent menthol might be added to these prescriptions for itching. If there is any superficial infection, the following formula is indicated.

Menthol	0.5
Phenol	1.0
Ichthammol	7.5
Zinc oxide	30
Olive oil	
Lime water	aa ad 250

OINTMENTS

When the eruption becomes dry, crusted, desquamated, fissured or lichenified, a bland ointment such as one of the following may be indicated—white petrolatum, aquaphor, rose water ointment, boric acid ointment, zinc oxide ointment, or the nongreaseless hydrophilic ointment base, U.S.P. Pastes and ointments should never be applied directly to the skin, but rather on a piece

of soft linen. Too vigorous removal of these applications will delay healing; they should be sponged off gently with sterile oil. Three per cent vioform ointment is of value if there is superficial infection. A very useful and soothing ointment is Calamine Ointment N.F. (as follows):

Prepared Calamine	17
Yellow wax	4
Wool fat	4
Petrolatum	75

The addition of a small amount of neocalamine will make this ointment skin color.

Tars should never be used in the treatment of the early stages of an eczema or acute dermatitis, but they are of great value in persistent pruritic patches of weeks' duration. This is particularly true in so-called infantile eczema. White's original formula is of great benefit:

Crude coal tar	2
Zinc oxide	2
Cornstarch	15
Petrolatum	15

The newly introduced group of so-called **antihistaminic ointments** are of value in certain selected cases. Five per cent Thephorin ointment has been beneficial in a carefully selected group of persistent eczemas. Two per cent Pyribenzamine cream and 2 per cent Histadyl cream are also of value in lichenified patches of eczema. However, one must be careful of the occasional sensitization reaction produced by these drugs. It is apparent that even the so-called antihistamines produce allergies in susceptible individuals.

Attempts at desensitization, despite the occasional report of success with plant oils, have not proved of value. They should be used cautiously, for they may cause severe reactions; this is true also as regards prophylaxis. Conflicting reports are published regarding even the value of rhus toxicodendron. Injections of this antigen may be dangerous. Antibodies have not yet been demonstrated in cases of contact eczema, but more delicate methods may yet reveal their presence.

In the treatment of eczema the physician must consider the patient as an individual. There is a great emotional reaction to a severe outbreak of the skin. He or she must be reassured that the eruption is curable, that injudicious self-treatment, neighborly advice, exercise, and indiscretion of diet will prolong the eruption. A careful, thorough examination and thoughtful advice with explicit directions as to the use of prescribed therapy will shorten the duration of the disease.

Treatment of Paronychia

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PARONYCHIA is a term derived from a combination of the Greek words meaning "around" and "nail." In medical phraseology, it is used to describe an inflammatory process resulting from an infection involving the space between the dermis and epidermis at the site where they fuse to form the cuticle of a nail.

A paronychia, or "run-around" as it is commonly known, may be considered one of the minor infections of the hand. In many instances, it may subside following little or no treatment. On the other hand, there may be resultant cellulitis, or suppuration, and unless proper therapy is instigated, an extension of the process may occur giving rise to a major infection of the hand. This may ultimately impair function, or even compromise the individual's life.

Paronychia may occasionally arise from a chronic granuloma from a fungus infection such as athlete's foot, or secondary to a dermatitis or an eczema. The most common cause, however, is either over-zealous or inadequate care of the cuticle. The fused dermis and epidermis forming the cuticle enable it to seal off the base of the nail from the outside by its adherence to the nail proper. In trimming the cuticle during manicuring of the nails, the potential space between the dermis and epidermis is frequently opened and infection may take place. On the other hand, if the cuticle is neglected it has a tendency to adhere to the nail and as the nail grows, the cuticle is pulled with the nail until it may be torn or cracked, providing a potential site for entry of infection.

Symptoms of paronychia are those of any inflammation resulting from infection, namely, dolor, rubor, tumor, and calor. The sequence in which they develop is usually pain first, then redness, followed by swelling, and later, heat. In the early phase of paronychia, the pain is a constant dull ache with soreness from pressure. As the process

progresses, pain develops as a characteristic throbbing type which is more marked when the affected part is held in a dependent position. This type of pain is due to edema of the tissues confined by the thick and tense epidermis. When redness develops it usually occurs at the site of entry of the infection, and soon thereafter extends around the nail on each side. This is also true of the swelling which develops almost simultaneously with the discoloration, and soon involves the tissues around the nail. Because of the small size of the nails it is difficult to determine when increased temperature has occurred. However, if the vermillion portion of the upper lip is touched to the area, heat changes may be detected somewhat earlier than by the sense of touch of the examiner's finger tips.

In the **treatment of a paronychia** one must attempt to prevent extension, to restore function, and to preserve normal appearance. One of the cardinal requirements for the physician who treats paronychia is a thorough understanding of the anatomy of the hand. This may not be particularly true for the paronychia per se, but since extension of the process may occur, it is only by the knowledge of the structures of the hand that he may be able to anticipate the site to which extension may occur. Also by this knowledge he is able to treat such secondary major infection with a minimal amount of injury to vital nerves, blood vessels, and other such structures.

As has been previously mentioned, many paronychias tend to subside spontaneously. When seen by the physician in the very early stages when symptoms are not too marked, the treatment is one of conservatism. The hand is immersed in hot water to which may be added a small amount of lysol solution. The hand should remain in water at least one-half hour out of every four. During the intervals between soaks, a copious quantity of Ergophene ointment (Upjohn) is applied under a loose bandage. At the end of twenty-four hours, this procedure will tend to devitalize the thick epidermis and may allow it to become elevated, with relief of symptoms.

If at the end of twenty-four hours, the process is no better or remains the same, incision and drainage should be performed. This should be carried out under a general anesthetic, such as pentothal or gas, so that the exploration may be careful and drainage adequate. The ethylchloride spray or the injection of a local anesthetic solution is not only a cause of inadequate drainage but also may give rise to ischemia of the part with resulting necrosis and extension of the infection. The incisions should be made parallel to the nail on each side, and, if necessary, connected by a transverse incision. Care must be taken that the transverse incision is not extended into the matrix of the nail or into the insertion of the extensor tendon. Any material obtained should be cultured so that antibiotic or chemotherapy may be initiated as indicated. A small rubber tissue drain is used to hold the wound margins apart, and again a copious amount of Ergophene ointment is applied.

During the next twenty-four hours, the bandaged hand should be immersed in hot water for a period of an hour at a time with a rest interval of two hours. During the rest period, however, the bandage should be kept warm by the application of hot water bottles. At the end of twenty-four hours, the dressing is changed. At this time under this regimen of treatment, the epidermis will separate at the edge of the wound, making it possible to strip it away in large sheets, revealing the underlying soft dermis. The removal of the thick covering tends to further relieve the symptoms. If the process has begun to subside, the soaks may be stopped and only the application of Ergophene ointment is continued.

Each day when the dressing is removed, a careful search to determine whether or not extension of the process is occurring must be carried out. Extension may take place in the form of a subungual abscess which would require the base of the nail to be elevated and removed, or a volar pad infection which would require lateral incisions located anteriorly, extending to the tip of the finger, but not over the end as in the old "duck's bill" incision. Infection of the volar fat pad may result in osteomyelitis of the terminal phalanx which requires the maintenance of adequate drainage and the removal of sequestrated bone It is not only unnecessary but unwise to curette the bone.

Further extension may take place in the form of a suppurative tenosynovitis. The extension is dependent upon which finger is involved. Because of the anatomic arrangement of the bursae of the hand, tenosynovitis of the middle finger may extend into the thenar space or into the palmar space. Extensions from the flexor tendon of the forefinger are into the thenar space, while extensions from the flexor tendons of the ring finger are into the palmar space.

Infections of the flexor tendons of the thumb and little finger are similar in that the primary bursa is involved which ruptures into the bursa of the opposite digit and hence into the forearm. For example, a flexor tendon tenosynovitis of the little finger involves the ulnar bursa, then ruptures into the radial bursa involving the thumb, and finally ruptures into the forearm. Just the reverse is true when primary involvement takes place in the thumb, and the bursa of the little finger is secondarily involved, and finally rupture into the forearm may take place.

Paronychia, even though considered a minor infection of the hand, may constitute a hazard to limb and life unless adequate intelligent therapy based on sound anatomic knowledge is carried out.

Scientific Exhibit

Physical Medicine in General Practice

SEDGWICK MEAD, M.D.

DIVISION OF PHYSICAL MEDICINE, WASHINGTON UNIVERSITY
SCHOOL OF MEDICINE, ST. LOUIS

A FEW conditions are illustrated which are among the commonest encountered in a physical medicine practice and which give the most gratifying results to treatment. Equipment is simple. The average practitioner who does a certain amount of traumatic work needs only the following:

1 or 2 treatment tables and pads (tables of wood)
1 one thousand-watt lamp, tungsten filament
1 five-hundred-watt lamp, tungsten filament
1 set assorted weights and boots and Sayre sling
1 shoulder wheel
1 whirlpool tank, used interchangeably for upper and lower extremities
1 paraffin bath with thermostatic control

Even more important than the equipment are the services of a skilled assistant. Beware the pitfalls of employing receptionists and other persons to administer treatments about which they know nothing.

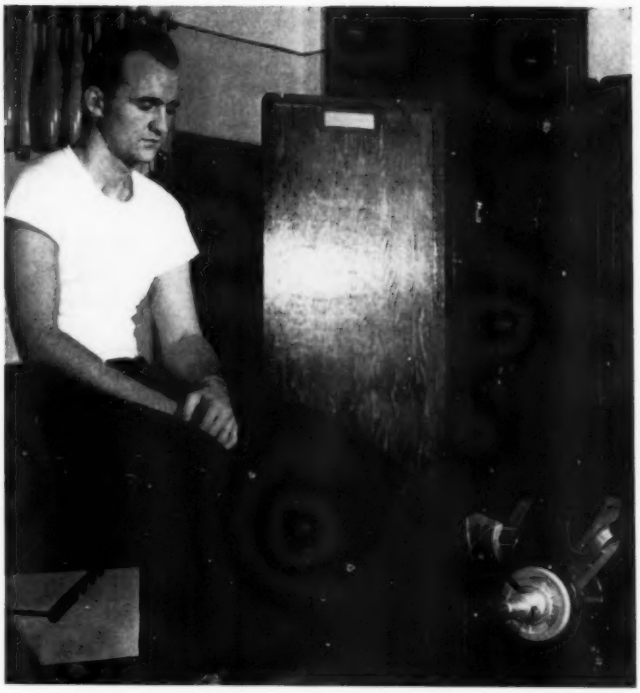
An ideal arrangement for a group medical practice would be to pool resources for equipment and hire a physical therapy technician. Be sure she is registered by the American Registry of Physical Therapy Technicians. This will insure that she trained at a school meeting the minimum requirements of the Council on Hospitals and Medical Education of the American Medical Association. It will also insure that she is an ethical medical aide who does not illegally practice medicine on her own.

Write detailed and intelligent prescriptions. Do not expect the technician to make diagnoses or assume too much responsibility for the objectives of treatment. She is there to carry out the details accurately and safely. Record joint range and muscle power objectively, and do not fall into a rut of repetitious treatment which is expensive to the patient and gets him nowhere.

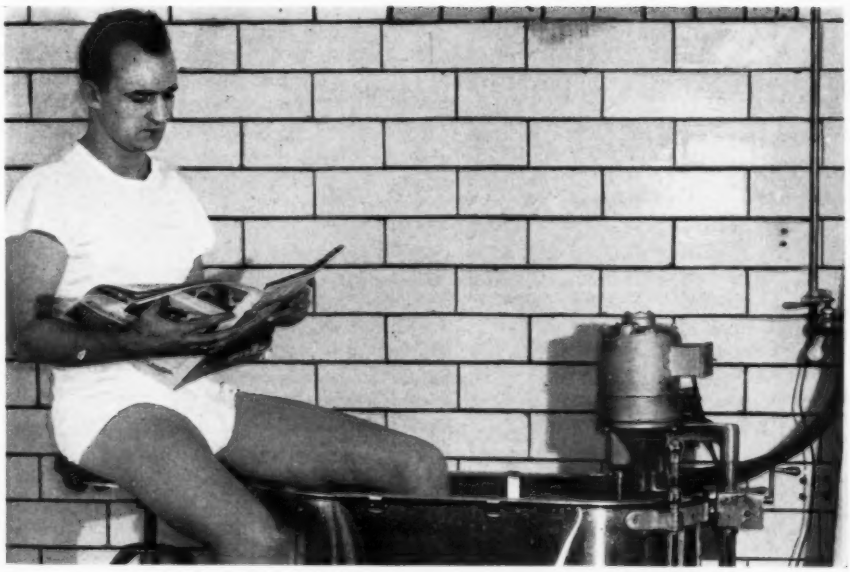
Explain to the patient candidly that physical treatment is rarely specific or curative; neither are most of the medications you prescribe. It is symptomatic and adjuvant, complementing the rest of the patient's care.

The measure of your success as a practitioner will be the number of rheumatoid arthritics you keep from drifting away to other doctors and clinics by giving them insight into the nature of their disease and by helping them preserve the maximum of function through the use of rest, salicylates, heat, simple exercises, and functional splints.

Prevent muscle and bone atrophy and stiff joints by early motion. Use massage to remove edema.



Progressive resistance exercise for disuse atrophy of muscle and for increase of joint range.

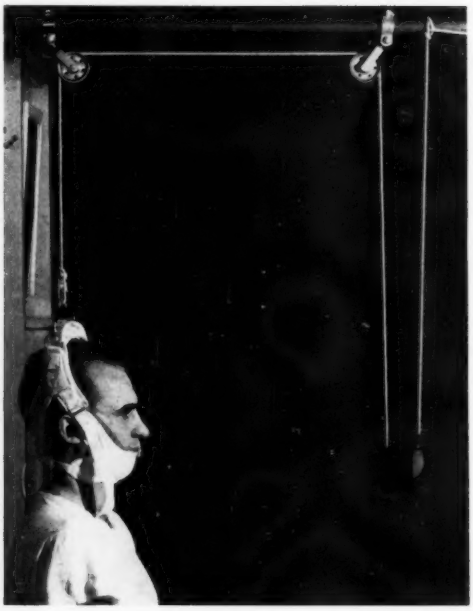


The whirlpool alleviates pain and increases circulation.

ARTHROPATHY OF CERVICAL SPINE

Sayre traction, combined with massage and heat, may produce a remission in degenerative arthropathy of the cervical spine.

X-ray shows abolition of normal curve and spurs along bodies of vertebrae.

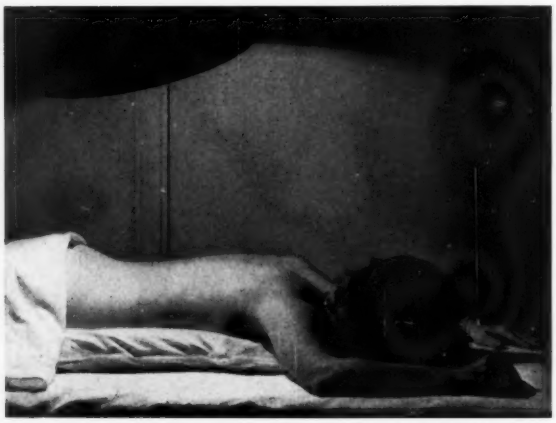


Sayre traction is simple to use and inexpensive.

LOW BACK PAIN

Why surrender your patients to cultists and "irregulars?" Treat them! Many low back strains respond to rest, heat, bed boards and massage.

Massage. Deep kneading breaks up abnormal contraction patterns and fatigue.



Lamp. Luminous heat from 500 or 1000-watt tungsten bulb.

Active-assistance exercise.

Motion will never be restored to a frozen shoulder by pills nor by all the infra-red lamps that may be used, although they will help control pain. Only therapeutic exercise will do it.

Use of the shoulder wheel.

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SCIENTIFIC EXHIBIT

The Surgical Management of Large Goiters

ROBERT W. BARTLETT, M. D.

WASHINGTON UNIVERSITY SCHOOL OF MEDICINE AND BARNES HOSPITAL, ST. LOUIS

THE size of a goiter bears little relationship to the absence, presence, or degree of thyrotoxicosis or to the incidence of malignant degeneration. Large goiters, however, frequently present mechanical problems due to pressure on the recurrent laryngeal nerves, the trachea, or the esophagus, and in addition invariably have pushed the superior pole vessels up under the angle of the jaw, thus making necessary special methods of surgical attack to insure safe removal of the tumor.

Before discussing the surgical approach, however, it is first necessary to consider the method of anesthesia most suitable to the problem at hand, and in this instance I have found endotracheal anesthesia invaluable in assuring an adequate airway during the manipulation of a large goiter. Before endotracheal anesthesia came into common usage, how well one remembers the times that upon elevating a large thyroid lobe the airway became obstructed through angulation of the trachea and the patient turned deeply cyanotic. The only remedy available was immediate replacement of the lobe into its original position.

In addition to the endotracheal, I do, however, carry out a bilateral superficial cervical nerve block at the midpoint of the posterior border of the sternomastoid muscle in order that closure of the wound may be completed subsequent to withdrawal of the endotracheal tube after removal of the goiter has been accomplished.

It is always possible for the recurrent nerves to become stretched during removal of a large goiter and if the patient is going to have any serious respiratory difficulty requiring tracheotomy subsequent to withdrawal of the endotracheal tube, the best time to know about it is when the neck is open rather than after the dressings have been applied and the instruments contaminated.

TECHNIC OF OPERATION

It is to be understood clearly that the method to be described is reserved solely for the removal of very large goiters. In our routine thyroidectomies the conventional approach is made under nerve block anesthesia rather than endotracheal and only the cervical fascia rather than the ribbon muscles is transcut.

Figure 1 indicates the rather generous collar incision through the skin and fat after which the upper flap is dissected for no more than an inch, since further upward reflection is unnecessary because of the fact that the next transverse cut is made between 1 and 2 cm. above the level of the skin incision. This second cut, Figure 2, includes the platysma, cervical fascia, ribbon muscles, and medial half of the sternomastoids on either side.

When this has been accomplished, the tumor tends to deliver itself and with retraction upward and outward of all layers employing narrow-bladed

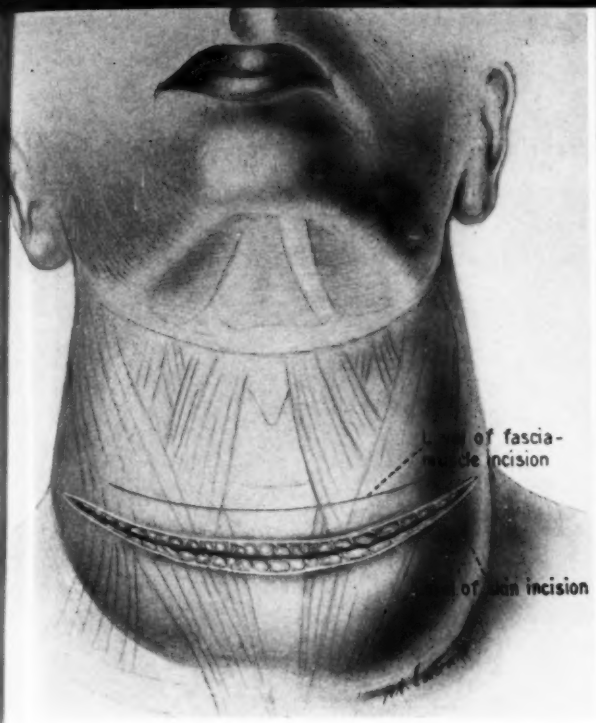


FIGURE 1

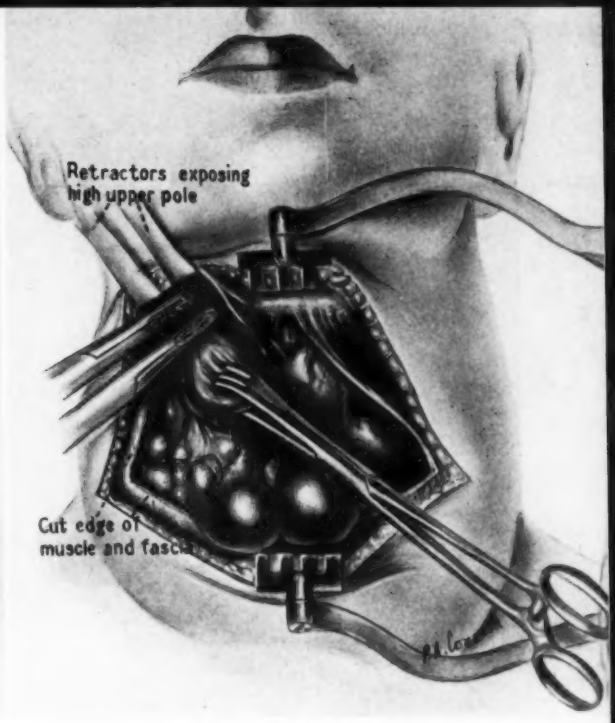


FIGURE 2

retractors and with counter traction by means of Lahey lobe forceps the very high upper pole vessels are readily exposed, clamped, and cut under direct vision. We feel that the exposure of the superior thyroid vessels which have been carried up under the angle of the jaw by the growth of the goiter is the only really difficult part of this operation and that this is made fairly easy by the described approach to them.

Figure 3 indicates our preference for transfixion of the superior vessels, also the manner in which we suture the lateral edge of the gland capsule to the pretracheal fascia with a continuous 000 plain catgut stitch after having carried out radical intracapsular subtotal resection. By this means complete hemostasis is obtained and there is no large raw gland bed to which the ribbon muscles would otherwise become adherent.

FIGURE 3

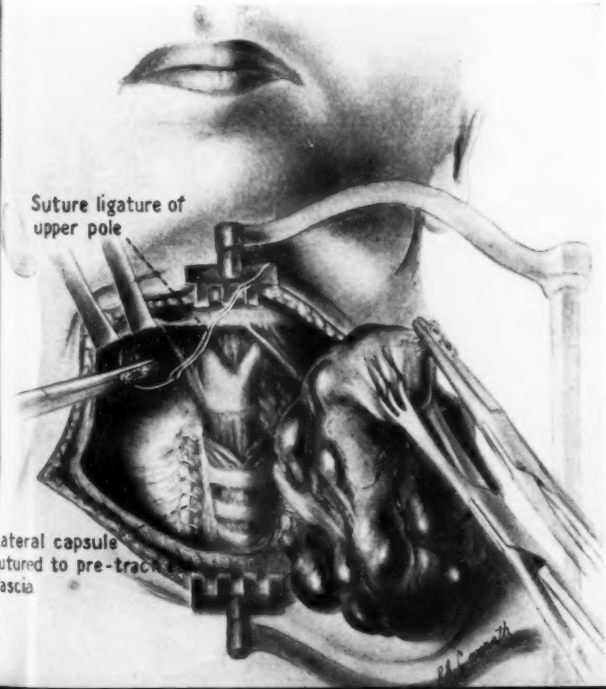
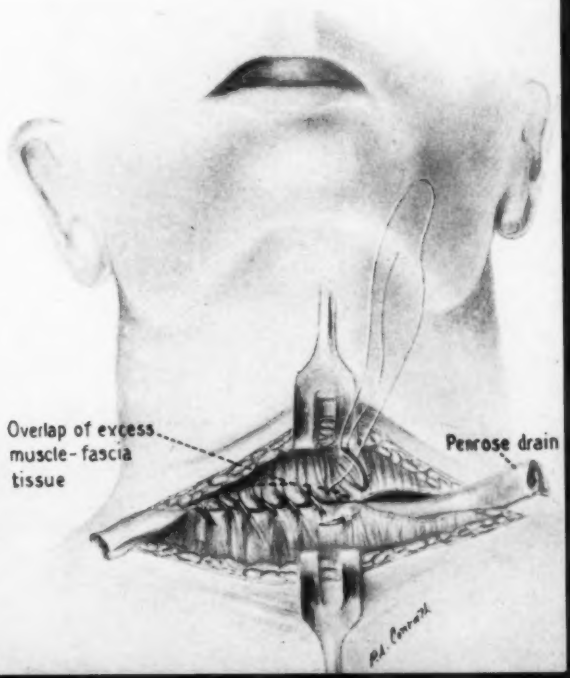


FIGURE 4



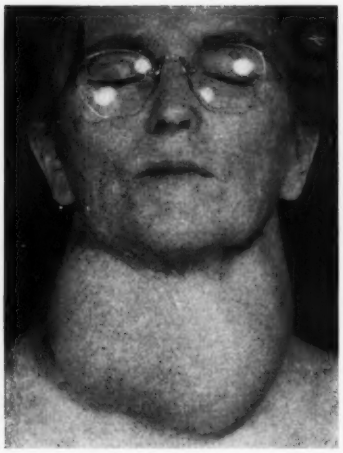


FIGURE 5

FIGURE 6

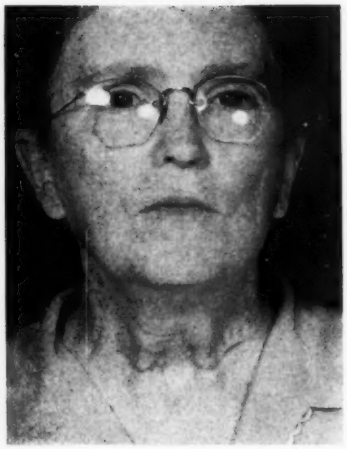


FIGURE 7

As mentioned earlier, the endotracheal tube is now removed in order to be certain that the patient will breathe satisfactorily without it. Closure is carried out by overlapping any redundant muscle-fascia as shown in Figure 4. This is much less time consuming than excising the excess with the concomitant necessity of obtaining hemostasis again. A small Penrose drain is carried across the midline and brought out the skin angles for twenty-four to forty-eight hours because of the fact that it is sometimes difficult to obliterate all dead space after removal of a large goiter.

Finally, after the skin has been closed with fine interrupted silk a pressure dressing employing mechanic's waste is applied for twenty-four hours as a means of avoiding serum collections.

The method described has the additional advantage of decreasing markedly the average operative time because it practically eliminates the necessity for dissecting the usual skin and fat flaps, and by so greatly facilitating the exposure of the superior poles makes them relatively easy to handle.

FIGURE 8

FIGURE 9

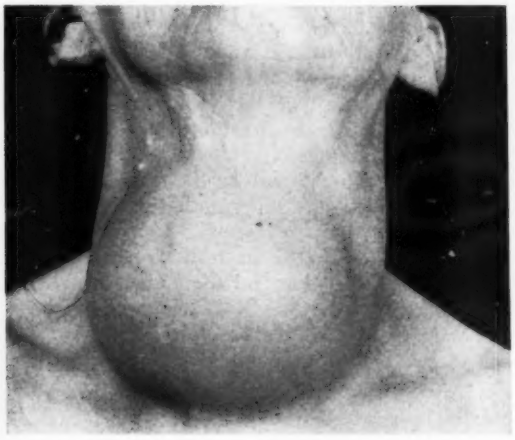


FIGURE 10

COMMENT

Certain points brought out in the illustrations are noteworthy. As shown in Figure 9 there has been no "sinking in" of the neck as a result of the wide muscle transdivision; also it is apparent that there is no necessity for excising stretched-out skin as its normal elasticity compensates for this after a few weeks (Figure 7). Therefore it is safe to say that one can expect a reasonably good cosmetic result after removal of large goiters.

Severe tracheal distortion is seen in Figure 14, making increasingly clear the absolute necessity for good endotracheal anesthesia for these operations. Extreme narrowing of the airway at the level of the clavicles is observed in Figure 12. This was a most unusual case in that a left lower pulmonary lobe atelectasis was known to exist (Figure 12) in a 71-year-old female, but diagnostic bronchoscopy could not be carried out until I had removed the large goiter (Figures 10 and 11) obstructing the passage of the bronchoscope. A biopsy positive for carcinoma then was obtained from the left lower

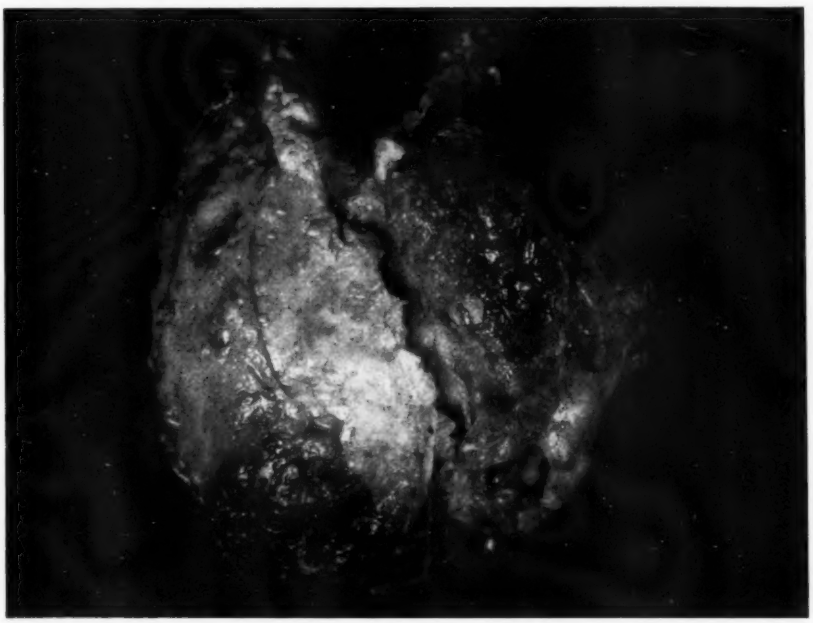


FIGURE 11

lobe main bronchus and ten days after thyroidectomy Dr. E. A. Graham successfully performed a left total pneumonectomy.

The vast majority of large goiters are of the nodular variety, one of the greatest dangers of which is malignant degeneration. Figure 13 illustrates this very situation in that this patient had been instructed in the past by ill-informed physicians "not to bother the goiter until it bothers you." I was able to remove the tumor at the time of operation but it proved to be carcinoma upon microscopic examination and the patient has died subsequently of metastases. It is therefore clear that the patient paid with his life for this extremely poor advice.

Pemberton, Ward, Lahey, G. Crile, Jr., myself and others have repeatedly pointed out that

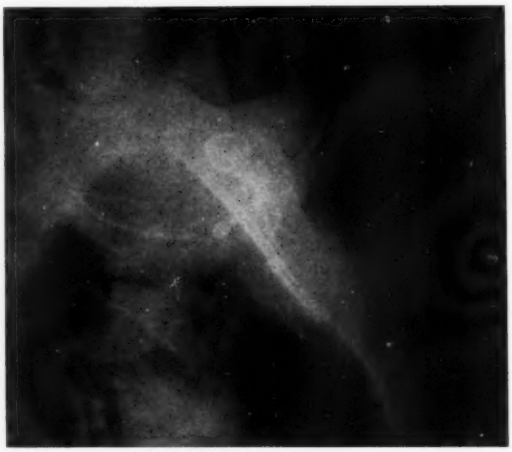


FIGURE 12

FIGURE 13

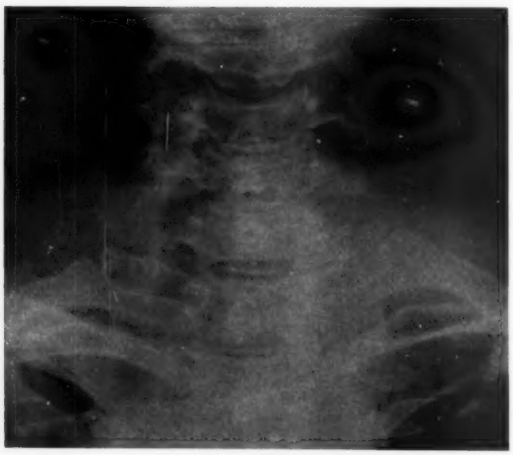


FIGURE 14

approximately 5 per cent of nodular goiters have become malignant by the time they are referred to us for removal. The size of the goiter bears little relationship to the incidence of malignancy, but cancer is several times more common in the solitary adenoma than in the multinodular gland.

Everyone is familiar with the fact that thyrotoxicosis and its resultant circulatory damage occurs in a significant percentage of nodular goiter cases. It is probably true that the glands with small, soft nodules do not constitute much of a threat to the individual but excepting these one ordinarily should advise thyroidectomy for nodular goiter since the combined dangers due to pressure, thyrotoxicosis, and malignant degeneration far outweigh the present day thyroidectomy mortality of 1 per cent or less in centers dealing with large numbers of these cases.

CLINICOPATHOLOGIC CONFERENCE

Acute Appendicitis with Perforation

HAROLD GORDON, EDITOR*

NICHOLS VETERANS ADMINISTRATION HOSPITAL, LOUISVILLE

CLINICAL ABSTRACT

A 32-YEAR-OLD white male was admitted to the hospital because of pain in the abdomen. The pain started in the epigastric region shortly after lunch two days earlier. It began gradually and continued steadily, unaccompanied by nausea and vomiting. He went to work the following day, but had to quit because of the increasing severity of the pain which had shifted to the lower part of the abdomen. He took a laxative that afternoon and had three watery stools. His abdomen became tense, and the pain almost intolerable; however, it seemed a little less severe shortly after he entered the hospital.

Past history—He had never had any similar attacks and had never had indigestion.

Physical examination—His temperature on admission was 102.4° F.; pulse 105, respiration 20; blood pressure 120/80. He was well developed and well nourished, but appeared acutely ill and in distress. His lips and tongue were dry. There was generalized rigidity of the abdominal muscles, marked tenderness in both lower quadrants, more severe on the right side. His abdomen was slightly distended. No peristalsis could be elicited, and no masses were palpated. Rectal examination revealed slight pararectal tenderness bilaterally. A few hours later his abdomen was less rigid, but there was definite muscle spasm, especially in the lower quadrants. There was also tenderness in both lower quadrants, especially on the right. No other abnormalities were found.

X-ray reports—The chest appeared normal and there was no free gas beneath the diaphragm. A film of the abdomen, taken in the upright position, revealed fluid levels and also a slight amount of gas, distributed in small pockets, in the intestines. It could not be determined whether these were in the small or in the large intestines. The soft tissues of the abdomen were obscured because of a homogeneous density.

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Laboratory data—Erythrocytes numbered 4,350,000; hemoglobin 14 gm. per 100 cc.; leukocyte count 18,700 with 76 per cent segmented neutrophils, 12 per cent stab cells, and 12 per cent lymphocytes. No abnormalities were found in the urine. A Kahn test on the blood was negative. Bleeding and clotting times normal.

Course—An abdominal operation was performed a few hours after admission. His temperature subsided gradually until it was normal the second day after operation. During the third day his temperature was 100.4° F., the fourth day 102.2° F., and the fifth day 100.2° F. He had no fever after the fifth day. Administration of penicillin was started on admission and continued through the fifth day.

DISCUSSION

Dr. J. D. Hancock (Louisville, Consultant in Surgery): The history of severe, acute pain in the abdomen, in a young man with no previous attacks of indigestion, is quite typical of appendicitis. He did not have nausea or vomiting, but these are not essential in establishing a diagnosis of appendicitis. It is well to remember that he may have had anorexia, which may be considered a minimal degree of nausea. There is no note stating whether or not he cared to eat—one should always ask about that. I have seen many similar patients, with no nausea or vomiting, who had a definite dislike for food while the pain was present. I consider that a minimal degree of nausea.

The pain increased in intensity for about twenty-four hours, then shifted to the lower quadrants. He took a laxative and had three watery stools. His abdomen became rigid and the pain increased for a while, then decreased slightly.

There are certain conditions we can eliminate with reasonable assurance. He had had no previous operations, so it is unlikely that he had intestinal obstruction due to adhesions. He had no symptoms suggestive of peptic ulcer, although it is possible he may have had a very slight leak. A patient with a perforated ulcer usually is very sick right from the start; he is not apt to improve and then get

worse again, as was the case here. Also, there was no free gas under the diaphragm. The rigidity became a little less marked a few hours after admission and there was tenderness in both lower quadrants. I believe that his appendix must have perforated after he took a laxative and that the perforation relieved the pain temporarily.

The homogeneous density seen in the x-ray films, with hiding of the soft tissues, suggests the presence of fluid, which also makes me think he had a perforated appendix. The fluid levels demonstrated in the x-ray films are a bit confusing. Regional ileitis may give such a picture. Ileitis seems to be a disease which runs in cycles. Along about 1935, when the x-ray pictures were found to be rather characteristic, regional ileitis seemed to enjoy quite a vogue. Then it faded out again. Regional ileitis, in conjunction with appendicitis, may produce enough obstruction to cause fluid levels such as those seen in the films. It is quite possible that he may have had some induration about the ileum. I rather think, though, that he would have had some previous complaints if that had been the case. Sometimes we see a peculiar angulation at the site of the ileocecal valve, apparently congenital rather than inflammatory. It may not cause any symptoms until there is superimposed appendicitis; then there are symptoms of obstruction.

The postoperative fever is also in keeping with a perforated appendix. Sometimes a pocket forms about the perforation and becomes walled off. If such a pocket is broken into, active absorption occurs, causing fever. I don't believe he had any pulmonary complications. At least there is nothing in the abstract to suggest any. If he had had an abscess in the rectovesical space, the fever would not have subsided so promptly. A rectovesical abscess usually forms slowly and is apt to persist, so that symptoms appear and disappear more slowly. Sometimes such an abscess ruptures into the rectum or requires drainage. So far, then, we must conclude that the patient had acute appendicitis with perforation.

Apparently, also, there was some degree of obstruction. It would not surprise me to be told, later, that considerable edema was found in the terminal portion of the ileum, due to spreading inflammation. There is nothing in the clinical abstract on which to base a diagnosis of gangrenous appendicitis. I know of only two things by which we can make a preoperative diagnosis of gangrenous appendicitis—one is a chill; the other is that the patient looks more "septic" than this patient seems to have been.

When the meso-appendix is extremely edematous, friable, and juicy, as it is apt to be if the appendix is gangrenous, pylephlebitis may be a postoperative complication. It is a rare condition, but this man may have had septic thrombi or emboli in one of the portal branches which would account for the fever. Perhaps the penicillin therapy prevented their spread to the liver. We see gangrene before suppuration more commonly in the gallbladder than in the appendix. Perhaps it is due to the fact that in the appendix there is infection and suppuration first, then thrombosis some hours later. In the gallbladder, on the other hand, edema and obstruction cause early gangrene.

In summary, I believe this man had acute appendicitis with perforation and some localized obstruction in the ileocecal region.

Dr. Hamilton (Chief of Surgical Service): I am wondering if this man had a stocky build. He must have been a phlegmatic type or he would not have gone back to work. It seems to me that young children, old people, and certain stocky, phlegmatic types are apt to make light of their suffering. As Dr. Hancock remarked, nausea or vomiting is not an essential symptom. I agree, also, that it is important to inquire about a patient's appetite. When I see a patient with suspected appendicitis and discover he is hungry, I am relieved and less inclined to feel he requires an emergency operation.

This man also had fever when he entered the hospital. When a patient has a temperature of 102°, one has to think of something more than an uncomplicated appendicitis. The old idea that an appendix won't rupture in less than twenty-four hours certainly was not our experience in the Army. About 10 to 15 per cent of the men we saw with ruptured appendices during the war had ruptured within thirty-six hours or less.

The moderate generalized rigidity, rather than board-like rigidity, also is in line with appendiceal peritonitis. I believe the taking of a laxative played an important part in causing early rupture in this case. Rupture of the appendix in animals can be hastened by giving laxatives.

I would be interested to hear if a fecalith was found in this appendix. Some men believe that a fecalith is present almost invariably in a ruptured appendix.

Careful postoperative management is also very important. We use penicillin—100,000 units every three hours if the patient appears moderately ill, every two hours if the infection is more severe. If he appears gravely ill, we combine penicillin with sulfadiazine or streptomycin. Some surgeons recommend that all three should be administered. I haven't seen a single death from appendicitis or any of its immediate complications since 1942.

Resident: What do you think caused the fluid levels seen in the x-ray films?

Dr. Hamilton: I think they might have been due to adynamic rather than mechanical obstruction. We have had several patients with such fluid levels, without mechanical obstruction but with

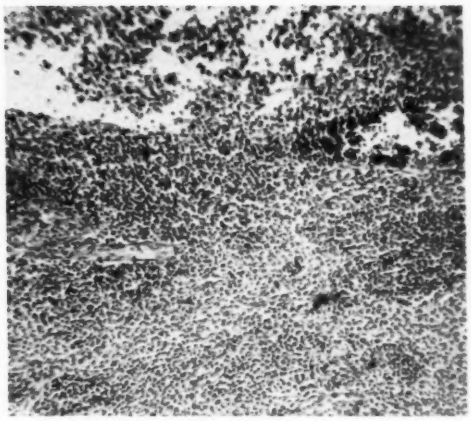


FIGURE 1. Acute suppurative appendicitis. The mucosa is ulcerated and necrotic. The walls are infiltrated with polymorphonuclear leukocytes. Purulent and necrotic exudate is present also in the lumen (hematoxylin-eosin, X 110).

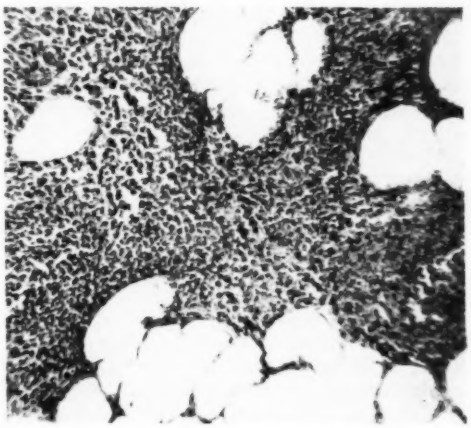


FIGURE 2. Pylephlebitis. The meso-appendix is infiltrated with neutrophils. In the right midportion is an early purulent thrombus (hematoxylin-eosin, X 160).

FIGURE 3. Gangrenous appendicitis. The wall of the appendix is necrotic, its mucosa no longer recognizable. Purulent exudate is present in the lumen (hematoxylin-eosin, X 110).

peritonitis. It does not appear to me that the films show a lot of air or fluid. I've also seen patients with well-advanced strangulation of the intestine with less fluid than in these films. In a "silent" abdomen with a lot of free fluid, there may be no visible pockets of air in the x-ray films.

Dr. Hancock: I don't believe fecaliths are invariably present in gangrenous appendices, but generally there is some type of obstruction. It seems to me that the absence of gas in the colon is against a diagnosis of paralytic ileus. The colon usually is dilated and full of gas in adynamic obstruction.

Dr. Shapiro (Chief of X-ray Service): The amount of gas shown in these films is hardly enough to be specific.

Clinical diagnosis—Acute appendicitis with rupture.

Dr. Hancock's diagnosis—Acute appendicitis with rupture.

Microscopic diagnoses—Acute gangrenous appendicitis; severe purulent peri-appendicitis; thrombophlebitis of veins in meso-appendix.

Dr. Gordon (Chief of Laboratory Service): All too often, doctors are obsessed by a "man bites dog" attitude, tending to dramatize rare diseases and dismiss common ones as trite. Pathologists frequently are accused of having "something up their sleeve." It is a relief to have a discussant accept an abstract at face value and arrive at a diagnosis in keeping with the data submitted.

The appendix had a dilated lumen and a thin, necrotic wall. The serosa was covered with discolored exudate. We didn't find a fecalith, but the dilatation of the lumen proves that there had been some obstruction earlier. The sections showed widespread necrosis of the mucosa and suppurative infiltration in the wall. Some of the small veins in the meso-appendix contained infected thrombi.

The sequence of events accordingly can be stated with confidence. Following the initial lesion, this man took a purgative. As a result of the abnormally stimulated peristalsis, there was perforation with spread of infection. His postoperative fever most likely was due to pylephlebitis, arrested by prompt medication. Many years ago Moynihan coined the phrase—pain, purgation, perforation. This case shows that lay people still need to be educated to the dangers of purgation as a panacea for pain in the abdomen.

Despite many investigations, appendicitis still poses many questions. We don't know why it is more common in young people than in old; in civilized than in primitive communities; in urban than in rural areas; among those who consume a high protein diet than those who subsist largely on carbohydrates; in males than in females (Boyd: Surgical Pathology. Ed. 6. Philadelphia, W. B. Saunders Company, 1947, page 287).

Wangensteen and Bowers (*Arch. Surg.* 34:496, 1937) stressed the dual role of obstruction and infection in the pathogenesis of appendicitis. They found evidence of obstruction in every one of 48 cases of gangrenous appendicitis, and in 72 per cent of 43 cases of suppurative appendicitis. They concluded that appendicitis is a form of closed loop obstruction. Since infection of the alimentary tract is unusual, they felt that the anatomic plan of the human appendix in some way favors infection and obstruction.

Boyd suggests that following obstruction there is increased intraluminal pressure with dilatation of the lumen, interference with the venous return, rupture of vessels, and bacterial invasion of the anoxic walls. The swelling increases until finally there is perforation.

Pylephlebitis is a rare complication of appendicitis. Ochsner and DeBakey (*U.S. Nav. M. Bull.* 45: 1945) found pylephlebitis, with abscess in the liver, in only 0.36 per cent of 68,198 cases of acute appendicitis. Hoerr (*Surgery* 18:305, 1945) reviewed the mortality rate of patients who were operated on for acute appendicitis at the Peter Bent Brigham Hospital from 1913 through 1940. The rate, computed for five-year intervals, showed no appreciable improvement with the passage of time. They found that delay and catharsis were chiefly responsible for this. Operation was delayed forty-eight hours or more after the onset of symptoms in 67 of 80 patients who succumbed; 49 of the 80 had received or taken purgatives. Only 13 of the 80 had unruptured appendices. If we could eliminate all delay and catharsis, appendicitis would only rarely be fatal.

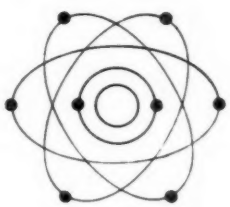
Dr. Hancock: I am glad Dr. Gordon selected this case. Appendicitis is a treacherous disease and frequently is overlooked. We should not demand or expect all the classical signs and symptoms to be present in every case. When a patient does not look especially sick, we are tempted to delay operation. Any disease with an annual mortality rate of 20,000 deserves study and emphasis. For all practical purposes, only the neglected patients die. It has been my experience that operation as soon as possible after the diagnosis has been established is rewarded by a low morbidity and a minimal mortality rate.

The Medical Bookman

ATOMIC MEDICINE*

"Never before in history have the interests of the weaponeers and those who practice the healing arts been so closely related. . . . The cloud which rose above Bikini does not dissipate; it hangs like a pall on the minds and councils of men—it permeates all the sancta of the mighty as well as the ecclesiastic cloisters of the Christian and pagan worlds."
—Clarence J. Brown, M.D. (Chapter 1, "Atomic Medicine," *Scope and General Background of Atomic Medicine.*)

SINCE the impact of atomic energy was imposed physically and spiritually upon this world, scientists have been consoling themselves in some measure with the thesis that, properly channeled, the atomic forces can be utilized *pro bono publico*. To date, however, specific knowledge of the medical aspects of the problems involved in radiation injury, illness, and therapy is far from complete or altogether encouraging. Nevertheless, as Dr. Brown wrote in the introduction to this book, "Somewhere during (this) period a new concept of medicine was born, evolutionary in its progress; a concept which has become increasingly intricate and complex."



In an effort to resolve some of these intricacies and complexities, the editor and a company of eminent authorities in their respective fields offer concise yet comprehensive discussions of the theories and principles involved in the effects and utilization of ionizing radiations. Even a cursory examination of what is described as "the first text on atomic medicine written in the atomic age," indicates that the physician who would practice in an atomic age must have more than a slight knowledge of nuclear physics, and of electronics, as well as the biology of ionizing radiations and of hematology.

In addition to Captain Behrens, who is Director of the Atomic Defense Division of the Bureau of Medicine and Surgery of the U.S. Navy, the contributing authors include men who participated in the atomic bomb tests and others who have been studying the effects on the Japanese of the atomic bombs that fell on Hiroshima and Nagasaki. No final conclusions can be made as yet of the medical effects of the radiations unleashed in Japan, but on the evidence presented thus far, certain postulations and conditional deductions have been made.

On the basis of observations made in Japan, for example, it is stated that radiation injury would not be the main factor in casualty production if bombing were confined to the above-the-surface type; blast and heat effects would probably cause as many or more casualties as would radiation.

A statement that should give planners for atomic disaster pause is that "Of more than 200 doctors in Hiroshima before the attack, over 90 per cent were casualties and only about 30 physicians were able to perform their normal duties a month after the raid."

Following chapters on *The Atom Family and Associated Physics* (Behrens), *Fission, Piles and Bombs* (Behrens), and *The Atomic Bomb in Action* (Dr. Harry H. Haight), Dr. Behrens continues with a discussion of *The Ionizing Radiation* in which he says that the unique feature of the atomic bomb and of radioactive isotopes from a medical standpoint is the emission of ionizing radiations, which in turn produce biologic changes. Differences in effects are related to the degree of penetration, ionization power, dosage factors, tissues involved and secondary factors.

Dr. Friedrich Ellinger, who prepared the chapter on *Fundamental Biology of Ionizing Radiations,* writes that a survey of the accumulated data on the effects of ionizing radiations on living matter reveals certain common features in the response of cells and tissues to irradiation, regardless of the nature of the rays, and these effects are qualitatively the same whether the source of rays is outside the body or within.

*Edited by Charles F. Behrens, M.D., Captain, MC, U.S. Navy, Director Atomic Defense Division, Bureau of Medicine and Surgery, Navy Department; Medical Officer in Command, Naval Medical Research Institute, National Medical Center, Bethesda, Maryland. 416 pages. 1949, Thomas Nelson & Sons, New York. $7.50.

With its primary effects centered on the cell, and more particularly the cell nucleus, ionizing radiation is generally believed to be concentrated in the large protein molecules and water of the cell. Changes in vital cellular function following irradiation are given as: (1) restriction of motility, suppressed or remain unchanged; (2) restriction or suppression of reproductive power; (3) restriction or suppression of growth.

Ellinger points out that the problem of cell stimulation by irradiation is important in considering radiations for clinical use. He concludes that experimental radiation therapy has not proved the existence of a true stimulation of cell function, but rather that it depends upon the depressant or destructive actions of the rays.

WHEN the total body is exposed to large doses of ionizing radiation, resulting anatomic lesions are classified by Dr. John L. Tullis *(Pathologic Anatomy of Total Body Irradiation)* into three groups: (1) tissue necrosis, (2) multiple hemorrhages, and (3) secondary infections. Necropsy findings where death occurred within a thirty-day period as a result of total body irradiation were (1) one or more ulcerations in the mucous membrane of one or more parts of the alimentary tract; (2) hemorrhages ranging from petechial to fairly extensive ecchymoses in the thoracic and abdominal viscera; (3) clotted blood in the lumen of the gastrointestinal tract and urinary tract; (4) pulmonary edema and/or hemorrhagic bronchopneumonia.

Deaths after thirty days, states Dr. Tullis, are ordinarily the result of intercurrent infection. If survival is prolonged, there is evidence of healing in the acute lesions and alterations of a chronic nature take place. In the Japanese, radiation deaths reached a peak in three to four weeks and occurred only infrequently after eight weeks.

Because the blood and blood-forming mechanism of the body are extremely sensitive to penetrating ionizing radiations, the field of hematology has been among the most directly influenced by the advent of atomic medicine. Dr. Eugene P. Cronkite, author of the chapter on *The Hematology of Ionizing Radiation,* says that the response of the peripheral blood is particularly altered and that such changes are the direct and indirect results of injury to the formative cells in the hematopoietic organs. He emphasizes that while data on the statistical relationship of leukemia to chronic exposure to ionizing radiations do not prove that leukemia can be caused by ionizing radiations in man, the correlation is sufficiently marked to urge a minimum of exposure to ionizing radiation.

Although radiation illness in its broad sense can be produced by all types of ionizing radiation, the dose required is said to vary with the kind, rate of administration, and penetrability of the rays. Dr. Cronkite divides radiation injuries and illnesses into two groups—acute and chronic—the acute resulting from brief intense exposure and the chronic from repeated or prolonged exposures of lower intensity. In the section on *Radiologic Safety,* Dr. John C. O'Leary and Dr. O. Schneider extend the definition of radiation sickness to describe the illness produced by over-exposure to ionizing radiations and neutrons from external source; radiation injury to describe localized injurious effects not necessarily associated with any systemic reaction, and radioactive poisoning to describe the illness which results when significant amounts of radioactive material enter the body.

The exact mechanism by which injury is produced is still poorly understood, but it is apparent, writes Dr. Cronkite, that diffuse cellular injury of different degrees is sustained by all tissues at the time of exposure to radiation, and that the clinical picture will vary with the relative degree of injury to various organs. He continues:

> The protoplasmic injury itself wherever the cells may be located, is probably produced by a combination of enzyme inhibition, alterations in cellular permeability, protein denaturation, and release of toxic substances. Concomitant with or shortly after the initial diffuse cellular injury, symptoms which we call toxic develop (nausea, vomiting, diarrhea, malaise, headache, anorexia, etc.). These toxic symptoms subside within twenty-four to forty-eight hours, and during a variable latent period, depending on the dosage, only the hematologic signs are easily found. During the latent period a series of cellular and histologic phenomena is occurring. These processes may involve autosensitization, abnormal adrenal function, a failure to adapt successfully to the injury, or a combination of these factors. At any rate, the latent period is terminated with a recrudescence of symptoms and the development of the delayed effects. The latter are well known and the mechanism of development can be fairly well explained.

Adequate studies on the nature of the hemorrhagic syndrome in man are still not available, but based on what is known to have happened in animals and to a lesser extent to the Japanese, the syndrome can be divided into three stages based on the time of appearance of (1) increased capillary fragility, (2) thrombopenia, and (3) prolonged clotting time.

Therapeutic measures which should be instituted include rest, good nursing care, strict asepsis, use of transfusions and prophylactic antibiotics, maintenance of proper fluid, electrolyte and acid-base balance, and the support of nitrogen metabolism. Dr. Cronkite concludes on a rather pessimistic note, however, saying that "to date the best one can do is to avoid the conditions that increase the mortality of radiation illness." *(Radiation Illness: Its Pathogenesis and Therapy.)*

A knowledge of the hazards involved in exposure to radiation effects is essential not only to

those who may be concerned with disaster, but also, and more immediately, to everyone who works with x-ray equipment or radioactive materials. There is still uncertainty as to tolerance level limits, but the present accepted standard for laboratory and industrial workers handling radioactive materials over a period of years is 0.05 r per day. The threshold of safety for the various cell types of the body still remains to be determined.

Of primary interest in medical research and therapy are radioactive isotopes. Because of their extreme sensitivity of detection by special apparatus and their unique specificity as tags, the artificial radioisotopes have become of tremendous value in the identification of certain cells. They also permit the study of the processes of nutrition and growth, both normal and abnormal, absorption, conversion, assimilation and secretion of nutrient compounds in plants, animals, and man. *(Radioactive Isotopes: General Considerations*—Dr. Charles F. Geschickter and Dr. Murray M. Copeland.)

Radioactive iodine (I^{131}) has been most prominently employed as a biologic tracer in patients with cancer of the thyroid. According to Geschickter and Copeland, about one case in five of thyroid cancer shows definite response to radioactive iodine, but dosage calculations are still experimental.

Radioactive carbon is considered to be the most valuable tool in the study of organic synthesis in general, because of carbon's wide distribution in plant and animal life.

Although radioactive isotopes seem to offer great promise as therapeutic agents, the present authors urge caution in their complete acceptance and use for the time being. They say that the use of radioisotopes in a therapeutic capacity is complicated by such factors as: the disintegration rate of radioactive atoms is specific for each element; the biologic effect varies with the characteristic radiations of each element, and the ability of the tissues to select the element or compound limits the amount of isotope absorbed.

When using radioisotopes for tracer studies and clinical treatment, the user must have a thorough knowledge of radiation dosage and its safety limits, avoid contamination as a factor in unreliable data, and avoid contamination as a health hazard.

Radioactive phosphorus, which was the first artificial isotope to find widespread application to the cancer problem is only effective, state Geschickter and Copeland, in diseases of the bone marrow which are highly radiosensitive. Although symptomatic relief and control of the blood count (both red and white cells) have been striking in polycythemia vera, they feel it is too early to permit a comparison of the duration of life with patients treated with P^{32} and the duration of life in similar cases of polycythemia treated by roentgen rays, phlebotomy, nitrogen mustard, phenylhydrazine, and other methods.

In the concluding chapter of the book, Dr. Shields Warren and Dr. Rupert H. Draeger discuss the basic problems of *Research in Atomic Medicine*. Reviewing the medical problems of atomic energy, the writers say that they are basically related to the biologic effects of energy from atomic sources, this energy emanating from naturally occurring or artificially produced radioactive substances or the neutron-induced fission of heavy isotopes, such as uranium 235 and plutonium 239.

Warren and Draeger conclude that "basic research is an urgent need in all fields related to radiation biology," and cite as the most pressing goal a better understanding of: (1) The precise nature of interference with life processes and biochemistry of various types of cells and tissues caused by ionizing radiation; (2) Prophylactic and therapeutic measures relating to radiation illness; (3) More precise knowledge of genetic effects, particularly of remote type; (4) Further progress in hematology and pathology; (5) Further progress in methods of detection and dosimetry; (6) Practical applications of basic studies to permissible dosage calculated risks, radiologic safety, therapy.

In addition to the subjects already mentioned, the book includes chapters on *Cumulative Effects and Permissible Dosage Limits of Ionizing Radiation* (Behrens), *Detection and Measurement of Radiation* (F. W. Chambers, Jr., and Maynard Eicher), *Atomic Disaster Planning* (Dr. O. Schneider and Dr. E. Richard King), *The Acceleration of Electrically Charged Particles and Related High Voltage Apparatus* (Richard H. Lee, Ph.D.), *Tracer Methods in the Biologic Applications of Radioisotopes* (Dr. David Minard), *Radiophosphorus and Radioiodine* (Geschickter and Copeland), *Radioisotopes of Medical Interest, Other Than Radiophosphorus and Radioiodine* (Geschickter and Copeland), *The Design and Operation of Laboratories Employing Radioisotopes in Medical Research* (Gordon C. Bell and George W. Imrie, Jr.) and *Radiation Effects of Particular Importance in the Practice of Dentistry* (James A. English, D.D.S.).

In a book of this nature, written by a number of authors, there is inevitably some duplication and overlapping, but it is minimal. Furthermore, because to many readers much of the information is still unfamiliar and new, what repetition there is serves to clarify and emphasize the material.

Whether or not the practicing physician or student is presently concerned with the problems of irradiation and radioactive substances, the subject is now universal and as Dr. Brown says in the first chapter, "Enlightenment will do no harm and will accomplish much to dispel certain fears and apprehensions which may arise."

S. C.

New Books Received

► HEMATOLOGY FOR STUDENTS AND PRACTITIONERS - - -

By Willis M. Fowler, M.D., Professor of Internal Medicine, University of Iowa, with a chapter by Elmer L. DeGowin, M.D., Assistant Research Professor of Medicine, University of Iowa. Ed. 2, revised. 535 pages, 184 illustrations, 8 color plates. 1949, Paul B. Hoeber, Inc., New York. $8.50.

When a textbook is an embellishment of an outline well seasoned by long use for instruction of students, written by a continuously active teacher of the subject, the product is likely to be a simple, practical, lucid exposition. *Hematology for Students and Practitioners,* first published in 1945, is a notably successful example. Now Willis Fowler offers a revised edition, with the collaboration of E. L. DeGowin, in which the therapeusis and etiologic concepts of several of the diseases of the blood, proved and accepted during the past four years, have been incorporated.

Use of folic acid in the treatment of pernicious anemia, sprue and nutritional and macrocytic anemia is explained. Urethane for leukemia and nitrogen mustard for lymphoma are conservatively evaluated. Results of radioactive phosphorus for polycythemia and leukemia have been fairly presented.

DeGowin's chapter on transfusion of whole blood and blood derivatives is of particular value in the consideration of blood grouping and typing. The intricacies of subgroups and the Rh– blood system are clarified as well as may be for the understanding of both practicing physicians and surgeons.

For pediatricians, the hemalogous patterns and reactions of infants and children which differ from the changes expected and observed in adults under like circumstances are described.

In this book, the diseases of the blood and blood-forming organs are considered to be the concern of the practicing physician, and not matters for erudite speculations of hematologists.

J. B. C.

► AN ATLAS OF ELECTROCARDIOGRAPHY - - -

By William Dressler, M.D., Cardiologist, Maimonides Hospital, Brooklyn; Consultant in Cardiology, Brooklyn Hospital; Lecturer in Medicine, Long Island College of Medicine, and Hugo Roesler, M.D., Cardiologist, Department of Medicine; Associate Professor of Radiology, Temple University Medical School and Hospital, Philadelphia. 503 pages, 92 illustrations, 342 electrocardiographic tracings. 1949, Charles C Thomas, Springfield, Illinois. $14.00.

This publication is an excellent aid and source of authoritative information for the practitioner who interprets electrocardiograms.

The authors have avoided the monotony of didactic texts by combining the academic and clinical approach. On the one page is the actual tracing and on the opposite are the interpretation, clinical data, diagnosis, and discussion. All aspects of EKG, including the recent advances, are so treated, emphasizing differential diagnosis. Following each group of similar patterns, there is a summary and condensation of previous discussions.

Following the section on EKG Patterns and Disturbances of Rhythm, the diagnosis of myocardial infarctions is extensively discussed. The advantages of the precordial leads are demonstrated, using the CR, CF, and V leads. As to which kind of chest lead is most important, no agreement has been reached. The pitfalls of using only two or three precordial leads is demonstrated. Localization of myocardial infarction is correlated with postmortem findings and serial tracings are presented.

In addition, the effects of drugs, metabolic disturbances and the manifestation of the known diseases of the heart on the electrocardiogram are illustrated. Finally, the book is completed with a discussion of the importance of the unipolar leads.

R. W.

► THE ADRENAL GLAND - - -

By Frank A. Hartman, M.D., Research Professor of Physiology, Ohio State University, and Katherine A. Brownell, Ph.D., Instructor in Physiology, Ohio State University. 581 pages, 72 illustrations. 1949, Lea & Febiger, Philadelphia. $12.00.

Drs. Hartman and Brownell have covered all phases of an intriguing and vitally important organ, in their comprehensive treatise on the adrenal gland.

Beginning with a text-like basic science coverage of the gland, the authors delve into detailed chemistry, hormonal, and pharmacologic studies and with these include the most recent experimental data. Presented too is an extensive physiological analysis in relation to electrolyte and water balance, energy metabolism and dietary factors. Next, the interrelations with the pituitary, thyroid, and sex glands are presented.

The clinical syndromes and disease entities (Addison's, Cushing's, acute and chronic insufficiency, chromaffin hypersecretion, adrenogenital syndrome) are discussed in scholarly detail. (Any pertinent material that may be omitted is available through the voluminous 125-page bibliography.)

R. W.

► FUNDAMENTAL CONSIDERATIONS IN ANESTHESIA - - -

By Charles L. Burstein, M.D. 153 pages. 1949, The Macmillan Company, New York. $4.00.

In Dr. Burstein's own words, "modern texts of physiology and pharmacology are, paradoxically, too complex (yet) inadequate" when one considers the rapidly expanding specialty of anesthesiology.

In his detailed yet concise volume the author deals with those physiologic-pharmacologic problems of special interest to the anesthesiologist. His chapters on autonomic nervous system control, respiratory disturbances, circulatory disturbances, etc. are presented from the standpoint of etiology, symptomatology, and therapy. The author's rich clinical experience correlated with research in the animal laboratory make this text both practical and meaningful.

E. N. C.

► CARDIAC CATHETERIZATION IN CONGENITAL HEART DISEASE - - -

By André Cournand, M.D., Associate Professor, Department of Medicine, College of Physicians and Surgeons, Columbia University; Janet S. Baldwin, M.D., Assistant Professor, Department of Pediatrics, New York University College of Medicine; and Aaron Himmelstein, M.D., Instructor, Department of Surgery, College of Physicians and Surgeons, Columbia University. 108 pages, illustrated. 1949, The Commonwealth Fund, New York. $4.00.

The authors of this monograph are to be commended for their concerted efforts in pooling their respective studies, both clinical and laboratory, in an effort to compare and integrate clinical and physiologic data. It is only through pilot endeavors such as presented herein that we shall gain better understanding of physiologic factors underlying our clinical observations and so add to our diagnostic acumen for congenital heart disease, as well as to our knowledge in the field of physiology of the circulation.

In the first part, the technic of catheterization and physiologic methods including the tracings and formulas for calculation of blood flow and blood shunts are presented. These data are carefully presented and analyzed by the authors. The second part presents the most common types of cardiac malformations encountered in the noncyanotic group. This is a clinical section of 17 illustrations that have been thoroughly studied with these newer diagnostic methods.

R. W.

► CLINICAL AUSCULTATION OF THE HEART - - -

By Samuel A. Levine, M.D., Clinical Professor of Medicine, Harvard Medical School; Physician, Peter Bent Brigham Hospital; and W. Proctor Harvey, M.D., Research Fellow in Medicine, Harvard Medical School; Assistant in Medicine, Peter Bent Brigham Hospital. 327 pages with 286 figures. 1949, W. B. Saunders Company, Philadelphia & London. $6.50.

The presentation of a volume on clinical auscultation of the heart serves to stress the importance of simple methods of clinical examination—methods which have been relegated to the background with the advent of such complicated apparatus as the x-ray and electrocardiograph.

The auscultatory findings and their clinical interpretation in both normal and pathologic hearts are presented in a vivid manner. The text is profusely illustrated with phonocardiograms, graphically depicting the various tones and murmurs, and electrocardiograms to show time relationship.

In the chapter devoted to systolic murmurs and their interpretation, the authors present criteria for evaluation of these murmurs, and emphasize their views on the controversial subject of mitral insufficiency.

T. Z.

Books received will be acknowledged in this department each month. As space permits, books of principal interest to our readers will be reviewed more extensively.

Cancer. By Beka Doherty, A.B. 327 pages. 1949, Random House, Inc., New York. $3.00.

Cystoscopy and Urography. By James B. Macalpine, D.Sc. (Honoris Causa), F.R.C.S. (Eng.), Lately Honorary Surgeon and Surgeon in Charge of the Genitourinary Department, Salford Royal Hospital; Consulting Urologist, Christie Hospital and Holt Radium Institute, Manchester. Ed. 3, revised and enlarged. 554 pages, with 338 illustrations and 15 colored plates. 1949, The Williams and Wilkins Company, Baltimore. $13.50.

The Diagnosis and Treatment of Adrenal Insufficiency. By George W. Thorn, M.D., Hersey Professor of the Theory and Practice of Physic, Harvard Medical School; Physician-in-Chief, Peter Bent Brigham Hospital, Boston. With the Collaboration of Peter H. Forsham, M.D., M.A. (Cantab.), Assistant in Medicine, Harvard Medical School and Peter Bent Brigham Hospital; and Kendall Emerson, Jr., M.D., Associate in Medicine, Harvard Medical School and Senior Associate in Medicine, Peter Bent Brigham Hospital. 171 pages, with 31 figures. 1949, Charles C Thomas, Springfield, Illinois. $5.50.

An Atlas of Amputations. By Donald B. Slocum, M.D., M.S., Orthopedic Surgeon, Sacred Heart General Hospital, Eugene, Oregon; Branch Consultant in Orthopedic Surgery, U. S. Veterans Administration; Formerly Chief of the Amputation Section, Walter Reed General Hospital, Washington, D.C. 562 pages with 564 illustrations. 1949, The C. V. Mosby Company, St. Louis. $20.00.

Diagnosis and Treatment of Brain Tumors and Care of the Neurosurgical Patient. By Ernest Sachs, A.B., M.D., Research Associate in Physiology, Yale University, New Haven; Formerly Professor of Clinical Neurological Surgery, Washington University School of Medicine, St. Louis. Ed. 2. 552 pages with 348 illustrations and 10 color plates. 1949, The C. V. Mosby Company, St. Louis. $15.00.

Unipolar Lead Electrocardiography. By Emanuel Goldberger, B.S., M.D., Adjunct Physician, Montefiore Hospital, New York; Cardiographer and Associate Physician, Lincoln Hospital, New York; Consulting Cardiologist, St. Joseph's Hospital, Yonkers, New York; Lecturer in Medicine, Columbia University. Ed. 2, thoroughly revised. 392 pages with 221 illustrations. 1949, Lea & Febiger, Philadelphia. $7.50.

Differential Diagnosis of Chest Diseases. By Jacob Jesse Singer, M.D., F.A.C.P., F.A.C.C.P., Medical Director, Rose Lampert Graff Foundation, Beverly Hills; Consultant in Chest Diseases, Cedars of Lebanon Hospital, Los Angeles. 344 pages, with 171 illustrations. 1949, Lea & Febiger, Philadelphia. $7.50.

Clinical Audiology. By Maurice Saltzman, M.D., Assistant Professor of Otorhinology, Temple University School of Medicine; Associate Otolaryngologist, Mount Sinai Hospital, Philadelphia. 195 pages with 82 figures. 1949, Grune & Stratton, New York. $5.00.

Acute Laryngotracheobronchitis. By A. Harry Neffson, M.D. 197 pages, illustrated. 1949, Grune & Stratton, New York. $5.00.

An Atlas of the Blood and Bone Marrow. By R. Philip Custer, M.D., Director, Laboratories of the Presbyterian Hospital, Philadelphia; Assistant Professor of Pathology, University of Pennsylvania School of Medicine; Consultant to the Armed Forces Institute of Pathology. 321 pages with 285 figures, 42 in color. 1949, W. B. Saunders Company, Philadelphia & London. $15.00.

Normal Values in Clinical Medicine. By F. William Sunderman, M.D., Ph.D., Professor of Experimental Medicine and Clinical Pathology, University of Texas Postgraduate School of Medicine; and Frederick Boerner, V.M.D., Late Associate Professor of Clinical Bacteriology, Graduate School of Medicine, University of Pennsylvania. 845 pages with 237 figures and 413 tables. 1949, W. B. Saunders Company, Philadelphia & London. $14.00.

The Eye and Its Diseases. By 92 international authorities; Edited by Conrad Berens, M.D., F.A.C.S., Managing Director, The Ophthalmological Foundation, Inc.; President, Snyder Ophthalmic Foundation; President, American Academy of Ophthalmology and Otolaryngology. Ed. 2. 1092 pages with 436 figures, 8 in color. 1949, W. B. Saunders Company, Philadelphia & London. $16.00.

Audiology; The Science of Hearing. By Norton Canfield, M.D., Associate Professor of Otolaryngology, Yale University School of Medicine; Consultant in Audiology, Veterans Administration; Consultant in Otolaryngology, Office of the Surgeon General, Department of the Army. 45 pages. 1949, Charles C Thomas, Springfield, Illinois. $1.75.

For the New Mother. By Mildred V. Hardcastle, R.N. Illustrated by Shirley Tattersfield. 163 pages. 1949, The John C. Winston Company, Philadelphia & Toronto. $2.00.

Men of Medicine

General Practitioner of the Year

Dr. Andy Hall of Mt. Vernon, Illinois, who in nearly sixty years of general practice has devoted himself to his patients, his community, and his country, was named "General Practitioner of the Year" by the House of Delegates of the American Medical Association, at its mid-year meeting.

Other nominees presented by the Board of Trustees were Dr. Thomas Edward Rhine of Thornton, Arkansas, and Dr. Lyle Hare of Spearfish, South Dakota.

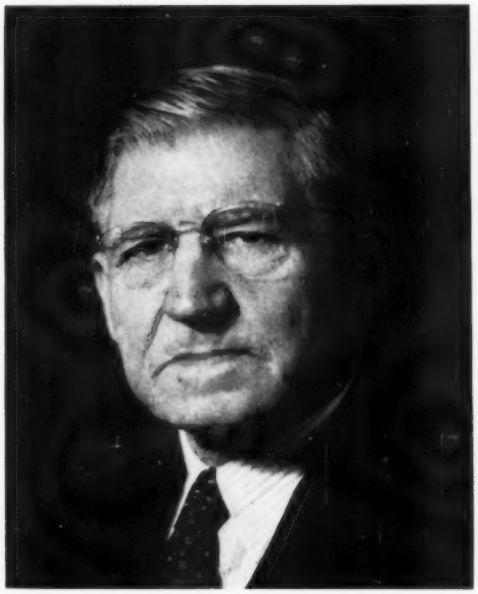
When he started his practice in southern Illinois in the 90's, Dr. Hall had to cope with all the exigencies which arose in an undeveloped area. He was not only a "horse-and-buggy" doctor, but many times a "walking" one, too, as he often had to reach patients on impassable dirt lanes and roads.

Now, however, the horse and buggy of the 1890's has become an automobile, and the four miles an hour afoot through the mud are now sixty miles an hour over good roads. The two rooms over the drugstore are a suite in a modern office building, staffed and equipped with the personnel and equipment of a modern practice. The least change has been in Dr. Hall himself, who is still actively and effectively serving the patients who depend on him.

Born on a farm in southern Illinois on January 8, 1865, Andy Hall got his first few years of schooling in a one-room log school house, and later at the public school at McLeansboro, Illinois Normal, and the Business College at Dixon. He was graduated from Northwestern University Medical School in 1890 and set out to establish his practice in Mt. Vernon.

Dr. Hall has a record of service to his country in three wars—Spanish American, in which he was commissioned Regimental Surgeon; World War I, when he was assigned to duty at the Base Hospital at Camp Upton, New York, and in World War II he was chairman of the Medical Board of Appeals under Selective Service for the 29th District of Illinois.

From 1929 to 1933, Dr. Hall was director of the Illinois State Department of Public Health and his work in that position is considered a model for the Department. He was elected mayor of Mt. Vernon in 1897 and for eight years headed the Mt. Vernon Township High School Board.



DR. ANDY HALL

Medical organization service includes fifteen years as secretary of his county medical society of which he was later president, and the presidency of the Southern Illinois Medical Society. He was a councilor of the Illinois State Medical Society for nineteen years.

In 1946, the Mt. Vernon Chamber of Commerce voted him its Distinguished Service Award "for outstanding and distinguished community service." The esteem in which he is held by his community was expressed by the Mt. Vernon superintendent of schools recently when he said: "He is the best known, best-loved and most highly respected man in this community . . . I have never heard an unkind sentiment uttered about him . . . he is a model for all doctors and living proof of the quality and predominant character of American medicine. Because of him Mt. Vernon respects all physicians the more, and if his story were told nationally, it would carry the same lesson to all our citizens."

EDITORIALS

Postgraduate Medicine OFFICIAL JOURNAL OF THE INTERSTATE POSTGRADUATE MEDICAL ASSOCIATION OF NORTH AMERICA — ORGANIZED IN 1915

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THE GENERAL PRACTITIONER— WHAT OF HIS FUTURE?

DURING the meeting of the World Medical Association, held in London in October, 1949, one of the most important discussions concerned the status of the general practitioner in various nations of the world. A special committee which was concerned with postgraduate medical education was headed by Dr. J. A. Pridham of England and included also representatives from Cuba, Austria, France and India.

The results of a questionnaire, which was sent to forty national medical associations, indicate that some countries may have an excess of specialists as compared to general practitioners but that there is a dearth of specialists in the world as a whole. Particularly significant, however, was the conclusion that postgraduate education of the general practitioner is of first class importance. Continuing the discussion, the report reads:

> "Lip service is paid to him as the backbone of medicine, and it is true that he should be. There is a danger, however, that he may be relegated to the position of one who gives first aid, or a filler of forms, or one who sorts out patients for reference to a particular specialist. Yet the development of medicine is giving the general practitioner an ever more important role. As specialties multiply and become more complex and their techniques more difficult, there is increasing need for the highly educated doctor with a wide outlook, and wide knowledge, who knows his patient from observation over years, knows his environment, knows his family background, and can view his case as a whole. He will know when to call in the aid of a specialist, and will be able to assess the advice. There is danger to the patient who chooses his own specialist, and he often wanders from one to the other, with no family doctor to help him."

In the course of the discussion, the committee pointed out that there are many ways by which a general practitioner continues his education and keeps up-to-date. The general practitioner may attend periodic refresher courses, meetings of medical societies or hospital conferences. Plans must differ in different countries or even in different areas of any one country. The committee felt, however, that the vast majority of general practitioners need refresher courses and that a month at least once in every five years should be devoted to the acquirement of information. Indeed the committee recommended that remuneration of the physician during the time spent in graduate education should come from the government in those countries in which there are social insurance plans.

Especially significant was the recommendation that hospitals should welcome visits from general practitioners. Posts as clinical assistantships should be created and made available for general practitioners. Moreover, the committee recommended that hospitals for use by general practitioners should be made available wherever possible or that beds should be assigned to use by general practitioners in ordinary hospitals where the general practitioner may attend his own cases and where he may have available the help of specialists. The committee urged that all national medical associations should give these questions consideration and take appropriate action.

In the course of the discussion evidence became apparent that the problem is one which is of greatest concern to the general practitioners of the United States and of England, but that it affects also the general practitioners of every nation.

In the United States the growth of specialization and the certification of specialists has tended to eliminate the general practitioner from the general hospital. Far too few hospitals provide for integration of general practitioners with the staff of the hospital or with its work. The staffs of hospitals are organized to provide departments for the individual specialists who devote themselves in their teaching to the training of residents and assistant residents—more specialists—and who provide little of importance for the advancement of the general practitioner. The tendency should be rather to provide beds for utilization by general practitioners in the care of their patients. A division of general practice should be included in the staff of the hospital. Membership of general practitioners on various special committees of the staff would logically ensue.

Conceivably the rapid advancement of medical science brought about by the discovery of new potent remedies far more efficient than any known heretofore will give the general practitioner increasing importance in the care of the sick. With the antibiotic drugs, the use of the x-ray for diagnosis and with access to oxygen, the general practitioner diagnoses and treats pneumonia efficiently and seldom requires consultation.

Especially interesting is the effect of new methods on such specialties as otolaryngology and dermatology. Operations on the mastoid are decreasing to the vanishing point because early diagnosis and proper treatment have diminished the incidence of severe otitis media and mastoiditis. The common cold is treated with antihistaminics and antibiotics. The sinuses are treated with direct application of antibiotic drugs and the use of aerosols. Otolaryngology may gradually become otolaryngologic surgery with few medical aspects.

Perhaps a similar path is being followed by urology. The use of the x-ray and opaque media has advanced diagnosis in this field. The potent remedies for infections of the genitourinary tract and the glandular products used in controlling other conditions make the trend toward the practice of genitourinary surgery with little remaining in the field of medical urology.

Even dermatology is yielding to the antihistaminics for the sensitivities, the antibiotics for the infections, the antipruritics for one of the most disturbing symptoms, and psychosomatic medicine for the dermatologic conditions not heretofore understood. Possibly dermatology may become more and more a specialty involved with conditions for which there are highly technical names but no specific treatments.

These tendencies indicate the necessity for careful consideration of graduate education for general practitioners. Such education as may be developed will prove fruitless unless hospitals, through new types of organization, can open their doors and their facilities to use by general practitioners. The trend of new developments indicates, incidentally, the disappearance of the special hospital and the incorporation in the general hospital of all of the highly specialized technics that are in process of perfection.

M. F.

YALE EXHIBIT HONORS JENNER

Honoring Edward Jenner and his discovery of vaccination, the Medical Library of the Yale University School of Medicine arranged a commemorative exhibit on the two-hundredth anniversary of the scientist's birth.

Included in the display were the pictures shown here—a watercolor of Jenner (artist unknown), pastel of Jenner by John Raphael Smith, and a caricature of the period entitled "The Cow-Pock or the Wonderful Effects of the New Inoculation."

The exhibit also covered early 18th century writings on smallpox inoculation, including Thacher's "Brief Rule" (earliest medical document printed in the colonies, biographical material on Jenner, copies of all the early editions of "An Inquiry into the Cause and Effects of the Variolae Vaccinae," which contained Jenner's most important conclusion: "that the cowpox protects the human constitution from the infection of smallpox," and other writings.

Consultation Service

This special consultation information service is offered as a regular monthly feature of *Postgraduate Medicine*. Readers are invited to call on this Service for answers to difficult medical problems from our consultants and members of our Editorial Board best qualified to help. Each question will be answered by mail and those of general interest will be published each month. Address all communications to Consultation Service, *Postgraduate Medicine*, 516 Essex Building, Minneapolis 3, Minnesota.

LINITIS PLASTICA

QUESTION: I am interested in a condition known as "linitis plastica." Will you please send me information that you have available on this condition—etiology, diagnosis, treatment, various views as to its causation, etc.

M.D.—Ontario

ANSWER: Linitis plastica is one unusual type of cancer of the stomach. The major portion or all of the stomach is involved by a spreading carcinoma which develops in the wall of the stomach in the submucosal layer. Ulceration of the mucosa is usually not present but the entire organ from the pylorus to the esophagus is thickened and rigid which gives it the descriptive term "leather bottle stomach."

Like all carcinomas of the stomach, its etiology is unknown but it probably begins in the deep mucosal glands and spreads out in the wall with little involvement of the mucosal surface. The symptoms are similar to other cases of carcinoma of the stomach but rarely are there obstructive symptoms present. The lesion tends to be confined to the gastric wall without regional lymph nodes or distant metastases.

A preoperative diagnosis can be suspected when the entire body of the stomach is involved and the organ narrowed to a tube-like structure. It must be differentiated from syphilis of the stomach.

The only effective treatment is total gastrectomy with esophagojejunostomy and jejunojejunostomy.

RICHARD B. CATTELL

NORMAL ACTIVITY FOLLOWING RHEUMATIC FEVER

QUESTION: Should a child who has recovered from the acute phase of rheumatic fever be permitted to resume a normal school routine? How much exercise should be permitted?

M.D.—Iowa

ANSWER: A child recovered from an attack of rheumatic fever should be permitted to resume normal activities if no cardiac damage has resulted. No restrictions are necessary. If the heart is damaged but no evidence of active myocarditis is present normal activity should be resumed unless considerable cardiac enlargement has resulted.

M. J. SHAPIRO

TREATMENT OF VAGINAL THRUSH

QUESTION: Is there a simple treatment for vaginal thrush in pregnant women which could be used at home?

M.D.—Virginia

ANSWER: The trouble about which you make inquiry is variously called moniliasis, yeast infection, or thrush. It has been most satisfactorily treated during recent years with a 1 or 2 per cent solution of gentian violet, a bluish stain, which should be applied not more often than once in five days and which should be used solely by a physician, not by a patient. Too many patients have developed inflammations from overtreatment with this medicine to make it safe for them to use.

A weak solution of iodine employed as a douche is another remedy which has stood the test of time. Usually it helps greatly but does not result in permanent cure. A favorite present day method of management is combined treatment with propion gel and iodine douches. This may be done satisfactorily at home, without notable supervision.

Propion gel may be obtained in tubes from most well supplied druggists. An adapter, holding ¼ teaspoonful, is screwed onto the jelly tube, like a nozzle, in order to fill it. It is then separated from the supply tube and is thrust deeply into the vagina, the contents of the applicator gently emptied into the deep vagina by means of the adapter plunger. This medicine is instilled into the vagina twice daily, morning and night.

Many use only the propion gel, but it seems that better results are obtained through employment of an iodine douche early in the morning before the gel treatment. The proper solution of iodine is ½ teaspoonful of 7½ per cent tincture of iodine to one quart of water. A series of gel treatments is usually given twice daily for three weeks. If the trouble persists then there is no harm in repeating the series.

The above described treatment can be used with safety by all except pregnant women. In the event of pregnancy, the douches are preferably omitted, the propion gel being relatively safe to use, although not entirely innocuous during pregnancy.

ARTHUR H. CURTIS

ALLERGIC REACTION TO PENICILLIN

QUESTION: If a patient had an allergic reaction to penicillin, such as urticaria, is it safe to try penicillin after several months again, provided an antihistaminic drug is given along with it?

M.D.—Connecticut

ANSWER: If a patient has experienced urticaria after the administration of penicillin, the patient subsequently may receive penicillin with some degree of safety. On occasions a patient who has shown this reaction to regular penicillin may be able to take pro-

caine penicillin without reactions. Furthermore, it is possible on occasion to desensitize a patient to penicillin. This is a rather tedious procedure and the advisability of doing so depends entirely upon the nature of the infection.

In other words, if a patient is suffering from a mild infection for which he can receive other therapeutic agents, desensitizing him to penicillin may not be justified. If, on the other hand, the patient is suffering with a life-endangering infection, such as subacute bacterial endocarditis, for which no other antibiotic therapy is available, then by starting with minute doses and gradually increasing the amount administered each day, and by combining this with antihistaminic drugs, it may be possible to bring about the patient's tolerance of increasing amounts.

LEG EXERCISES

QUESTION: Will you kindly inform me of some practical leg exercise that could be performed regularly in an ordinary dwelling. The patient is a business man and about 40 years of age.

I would like also recommendation of some general exercise for a man of this age that could be performed indoors, and references for reading concerning different types of physical exercise.

M.D.—Virginia

ANSWER: With proper references, it is easy to prescribe a set of leg exercises which can be performed regularly in an ordinary dwelling. However, without a description of the indications for doing such exercises, it is impossible to outline a suitable regimen. Furthermore, a description of any suitable set of exercises would take up more space than is available in an answer such as this. The exercises would vary according to the condition which is present.

Among the conditions which might be encountered and for which leg exercises might be prescribed are: weakness of the quadriceps femoris, contracture of the hamstring muscles, postural disturbances, deformities, arthritis of the joints and general weakness during convalescence from illness.

Descriptions of various types of leg exercises as well as general exercises for a man aged 40 will be found in the following textbooks: (1) Stafford, G. T., DeCook, H. B., and Picard, J. L.: Individual Exercises; Selected Exercises for Individual Conditions. New York, A. S. Barnes & Company, Inc., 1935, 111 pp.; (2) Drew, Lillian C.: Individual Gymnastics; A Handbook of Corrective and Remedial Gymnastics. Ed. 4, Philadelphia, Lea & Febiger, 1929, 276 pp.; (3) Dickson, F. D., and Diveley, R. L.: Exercise for Health and Correction. Philadelphia, J. B. Lippincott Company, 1923, 127 pp.; (4) Stafford, G. T.: Exercise During Convalescence; A Manual of Adapted Exercises. New York, A. S. Barnes & Company, 1947, 281 pp. (5) Kiphuth, Robert: How to Be Fit. New Haven, Conn., Yale University Press, 1942, 132 pp.; (6) Stafford, G. T.: Preventive and Corrective Physical Education. New York, A. S. Barnes & Company, 1928, 328 pp.; (7) Crampton, C. W.: Physical Exercise for Daily Use. New York, G. P. Putnam's Sons, 1924, 303 pp.; (8) Phelps, W. M., and Kiphuth, R. J. H.: The Diagnosis and Treatment of Postural Defects. Springfield, Ill., Charles C Thomas, 1932, 180 pp.

TREATMENT OF MUSCLE CRAMPS

QUESTION: What is the treatment of choice in cramps in the leg muscles of pregnant women? The cramps usually occur at night and tend to recur in the same place.

M.D.—Oklahoma

ANSWER: The treatment of cramps in the muscles of the hip, thigh, and leg varies with the cause. These theories are advanced in regard to causation:

1. Simple calcium deficiency—probably not valid. Cramps are neither more nor less frequent with low than with high calcium intake and blood levels.

2. Hypoparathyroidism (subtetany)—cases of this type occur but are probably rare.

3. The chemicophysical results of venous engorgement, congestion and stasis resulting from a number of factors (including simple pressure) which affect the iliac and tributary veins. This is by far the commonest type, venous stasis being in some degree almost universal. It is more or less identical with the cramps which follow prolonged overexertion in any muscle.

In treatment, from the practical point of view 6 things may be done:

1. Assumption of the knee-chest position for a few minutes every hour during the day.

2. Elevation of the legs as often as practicable.

3. Avoidance of excessive walking and standing—moderate exercise is beneficial in that it promotes a better circulatory status (best followed by lying down with legs elevated for fifteen to twenty minutes).

4. Calcium, since it is harmless, may be given in every case: lactate gluconate, milk (1 liter provides almost twice the normal daily requirement). True cases of parathyroid deficiency require intravenous calcium (chloride, 10 cc. 5 per cent), and may be benefited by parathyroid therapy.

5. For the relief of the acute attack nothing affords such immediate and complete relief as overstretching of the affected muscle (forcible dorsiflexion of the foot in cramp of the calf muscles; not too feasible in muscles of hip and thigh). Gentle exercise (walking around the bedroom) is fairly effective. These measures to be followed by heat applied over the affected muscles (electric pad).

6. Massage, while more or less effective, should be avoided because of the possibility of dislodging an embolus if thrombosis coexists.

WILLARD R. COOKE

New Drugs *and* Instruments

Information published in this department has been supplied by the manufacturers of the products described.

POLYVITAMIN DISPERSION

PURPOSE: Water-dispersible powdered preparation containing 6 vitamins.

COMPOSITION: Each level teaspoonful contains not less than:

Vitamin A	5,000 units
Vitamin D	1,000 units
Ascorbic acid	50 mg.
Thiamine	1 mg.
Riboflavin	0.8 mg.
Niacinamide	0.5 mg.

HOW SUPPLIED: In 3 ounce jars.

PRODUCER: Mead Johnson & Co., Evansville, Ind.

NUCLON

PURPOSE: Antihistaminic therapy for the common cold.

COMPOSITION: Each capsule contains:

Thenylpyramine (methapyrilene) fumarate	37.5 mg.
Dexedrine sulfate (dextro-amphetamine sulfate, SKF)	1.25 mg.
Acetylsalicylic acid	2.5 gr.

DOSAGE AND ADMINISTRATION: Should be administered at the very onset of the cold. Adults—2 capsules every four hours for 3 or 4 doses daily. Children 5 years of age or over—1 capsule three times daily.

CAUTIONS: Use with caution in patients hypersensitive to sympathomimetic compounds, in cases of coronary or cardiovascular disease in which vasoconstrictors are contraindicated, in presence of marked hypertension, and where there is known sensitivity to antihistaminic drugs.

HOW SUPPLIED: Bottles of 50 capsules.

PRODUCER: Smith, Kline & French Laboratories, Philadelphia, Pa.

LEDERCILLIN* PECTINIZED

PURPOSE: Parenteral penicillin therapy.

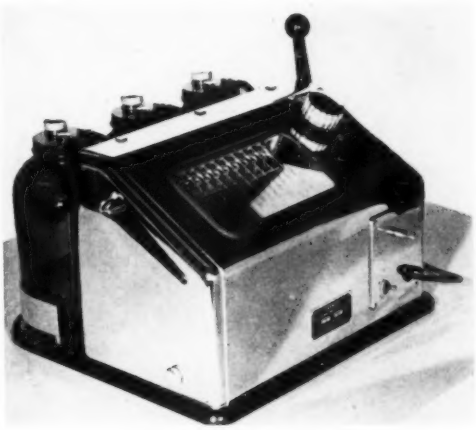
COMPOSITION: Each cubic centimeter contains 300,000 units of crystalline procaine penicillin G and 100,000 units of pectin-coated crystalline penicillin G potassium with 1.5 per cent aluminum monostearate in a peanut oil vehicle.

DESCRIPTION: Prompt absorption results from pectin-coated soluble penicillin which produces a level of 2 units of penicillin per cubic centimeter of blood within an hour or two of injection. Prolonged absorption results from slow-dissolving procaine penicillin, in the presence of aluminum monostearate, which is deposited at the site of injection and absorbed over a period of more than seventy-two hours.

HOW SUPPLIED: In 1 cc. sterile, disposable syringes and 1 cc. vials.

PRODUCER: Lederle Laboratories Division, American Cyanamid Company, Pearl River, N.Y.

*Reg. U. S. Pat. Off.



CASADY HYPODERMIC NEEDLE CLEANER

DESCRIPTION: In this machine the hubs of the needles are forcefully cleaned by an electrically driven swab. Then the needles are washed with three separate fluids, successively passed through the needles under 20 pounds pressure, followed by a stream of compressed air, leaving them dry and clean. One hundred needles can be swabbed out, washed, rinsed and dried in nine minutes. Further information available from:

PRODUCER: Medical Equipment Laboratories, 5404 Sierra Vista Ave., Los Angeles 38, Calif.

SEMVITA DROPS

PURPOSE: Vitamin supplement.

COMPOSITION: Each 0.6 cc. contains:

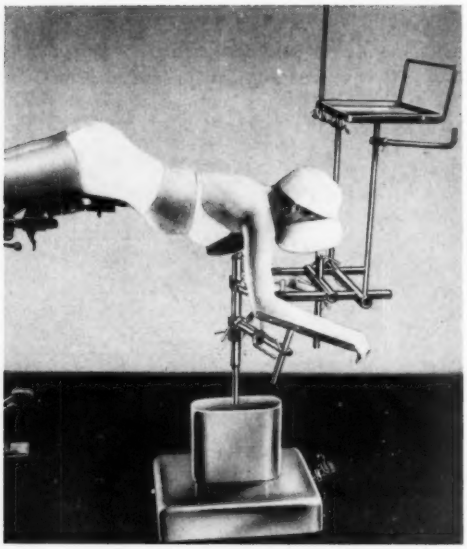
Vitamin A	5,000 Units
Vitamin D	1,000 Units
Thiamine hydrochloride	5 mg.
Riboflavin	0.4 mg.
Nicotinamide	10 mg.
Pyridoxine hydrochloride	1 mg.
Ascorbic acid	100 mg.

INDICATIONS FOR USE: As a preventive and corrective of rickets in infancy and childhood; during pregnancy and lactation; for debilitating illness, malnutrition, chronic gastrointestinal disorders, restricted diets, and increased metabolism.

DOSAGE AND ADMINISTRATION: Semvita drops are miscible with fruit juice, milk, cereal, dessert and other foods. The average daily dose for infants is 0.3 cc. to 0.6 cc. For older children and adults, 0.6 cc.

HOW SUPPLIED: In bottles each containing 30 cc. with dropper calibrated to indicate approximately 0.3 cc. and 0.6 cc.

PRODUCER: The S. E. Massengill Company, Bristol, Tenn.



NACLERIO SUPPORT

PURPOSE: Portable unit for prone-position surgery.

DESCRIPTION: Can be used with any standard operating table, since it is independent and not attached. In the prone position, contralateral spillage is avoided and adequate ventilation is assured, together with improved cardiac output. The operative field is favorably presented to the surgeon for each successive procedure by quick adjustment of the parts of the support.

PRODUCER: J. H. Emerson Co., Cambridge, Mass.

LUCORTEUM SOLUTION

PURPOSE: Crystalline progesterone solution in sesame oil for relief of menstrual distress and prevention of abortion.

DOSAGE AND ADMINISTRATION: By intramuscular injection. The following dosage schedules are suggested: Threatened abortion—5 to 10 mg. daily. Habitual abortion—5 to 10 mg. two or three times a week. Functional uterine bleeding—2 to 10 mg. daily for six to ten days prior to date of anticipated menstrual period. Functional dysmenorrhea and premenstrual tension—from 2 to 5 mg. daily for two or three days prior to menstrual period.

HOW SUPPLIED: In 5 cc. vials in concentrations of 5 mg. per cc., 10 mg. per cc., or 25 mg. per cc.

PRODUCER: Sharp & Dohme, Inc., Philadelphia, Pa.

NISENTIL HYDROCHLORIDE

PURPOSE: Analgesic for obstetric use.

COMPOSITION: 1,3-dimethyl-4-phenyl-4-propionoxy-piperidine hydrochloride (dl-alpha form).

DESCRIPTION: A narcotic compound similar in action to morphine.

DOSAGE AND ADMINISTRATION: Given by subcutaneous injection in doses of 40 mg. at least two hours apart. No more than four consecutive 40 mg. doses should be administered and the last dose should be given two hours or more before delivery.

HOW SUPPLIED: In 1-cc. ampules, 40 mg. per cc., packages of 6 and 50.

PRODUCER: Hoffmann-La Roche, Inc., Nutley, N.J.

BACI-TROCHE*

PURPOSE: Treatment of mild acute superficial infections of the mouth and throat.

COMPOSITION: Each troche contains 1,000 units of bacitracin.

DOSAGE AND ADMINISTRATION: The troche should be placed either between the cheek and gum or under the tongue and allowed to dissolve slowly without sucking or chewing. One troche every three hours, stopping only for sleeping, is recommended. Treatment should be continued for three or four days to secure maximum control and prevent relapse. In Vincent's infection, smears should be taken before and after treatment.

HOW SUPPLIED: Bottles of 20 troches.

PRODUCER: The Upjohn Company, Kalamazoo, Mich.

*Trademark.

AMOTROCIN*

PURPOSE: Antibiotic-antiseptic for relief of throat irritations and infections, especially those caused by gram-positive cocci.

COMPOSITION: Each lozenge contains:

Tyrothricin	1 mg.
Cetyl dimethyl benzyl ammonium chloride	5 mg.
Orthesin (Benzocaine 'McNeil')	3.5 mg.

Colored orange.

DOSAGE AND ADMINISTRATION: Adults and children: Allow one lozenge to dissolve slowly in the mouth (preferably between cheek and gum) and repeat every two or three hours as necessary (but not more than 8 lozenges per day).

HOW SUPPLIED: In plastic shatterproof vials of 12 and bottles of 100 and 1,000.

PRODUCER: McNeil Laboratories, Inc., Philadelphia, Pa.

*Trade mark.

ACETEST (BRAND) REAGENT TABLETS

PURPOSE: Detection of urine-acetone and recognition of acidosis.

DESCRIPTION: Instructions for performing an acetone determination are as follows: (1) place one Acetest Tablet on a clean white sheet of paper; (2) moisten tablet with one drop of the urine to be tested; (3) wait thirty seconds—then observe color of tablet. If the specimen contains acetone, the tablet changes color to a purple shade, the intensity of which varies with the quantity of acetone present. Only clinically significant amounts of acetone (1 part to 1,000 or greater) are detected; with less than this amount the tablet remains white or changes to a pale cream color.

HOW SUPPLIED: Bottles of 100 and 1,000 tablets.

PRODUCER: Ames Company, Inc., Elkhart, Ind.

BENADRYL WITH EPHEDRINE KAPSEALS

PURPOSE: Relief of hay fever, asthma, and other allergic states.

COMPOSITION: Benadryl hydrochloride (diphenhydramine hydrochloride, P. D. & Co.) 50 mg., and ephedrine sulfate, 10 mg., in a pink capsule with a blue band.

HOW SUPPLIED: Bottles of 100 and 1,000.

PRODUCER: Parke, Davis & Company, Detroit 32, Mich.

THERAPEUTIC FORMULA VITAMIN CAPSULES, APC

PURPOSE: Multivitamin therapy.

COMPOSITION: Each capsule contains:

Vitamin A	25,000 U.S.P. units
Vitamin D	1,000 U.S.P. units
Thiamine hydrochloride (B_1)	10 mg.
Riboflavin (B_2)	5 mg.
Niacinamide	150 mg.
Ascorbic acid (C)	150 mg.

INDICATIONS FOR USE: Vitamin deficiencies due to deficient diets; conditions which increase requirements for vitamins; convalescence.

DOSAGE AND ADMINISTRATION: Orally, one or two capsules daily.

HOW SUPPLIED: Bottles of 100.

PRODUCER: American Pharmaceutical Co., New York, N.Y.

50 MA SIMPLEX CONTROL

PURPOSE: Automatic x-ray control for diagnostic work.

DESCRIPTION: With the Simplex as part of an installation, only the three chief factors which govern x-ray exposure (ma, kv, and time) need be adjusted. Once the line voltage regulator has been set, the kv adjustment dials allow selection of precise operating voltages, and no filament current adjustment is necessary. A current selector allows a choice of three preset currents. These will usually be 5, 25, and 50 ma, but other values may be chosen at the time of installation. Adjustment of this selector puts into operation circuits providing proper automatic kv compensation.

Further information can be obtained from:

PRODUCER: Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa.

BILOGEN

PURPOSE: Choleretic and digestant.

COMPOSITION: Each Bilogen tablet contains 120 mg. of ox bile extract, 75 mg. of oxidized mixed bile acids, 30 mg. of desoxycholic acid, and 250 mg. of pancreatin.

DESCRIPTION: Ox bile extract is provided to stimulate bile secretion, oxidized mixed bile acids flush biliary ducts, desoxycholic acid promotes fat absorption, and pancreatin supplies digestive ferments.

INDICATIONS FOR USE: For relief of conditions due to absence of or deficiency in bile or pancreatic enzymes.

DOSAGE AND ADMINISTRATION: Four to 6 Bilogen tablets per day—1 or 2 tablets with a full glass of water after meals and at bed time—is recommended.

HOW SUPPLIED: Bottles of 100 and 1,000 tablets.

PRODUCER: Organon, Inc., Orange, N.J.

PHISODERM® WITH HEXACHLOROPHENE 3%

PURPOSE: Antiseptic, sudsing detergent cream (soapless).

COMPOSITION: Emulsion containing entsufon (sodium octylphenoxyethyl ether sulfonate), lanolin cholesterols and petrolatum. Hexachlorophene, (bis [2 hydroxy-3,5,6-trichlorophenyl] methane, also known as G-11*) 3 per cent, is incorporated during manufacture; the resulting product has the same *p*H value (5.5) as normal skin.

INDICATIONS FOR USE: For two-minute preoperative scrub and preparation, for cleansing skin, scalp, and certain mucous membranes.

DOSAGE AND ADMINISTRATION: A few drops are used for preliminary wash followed by rinsing. From 2 to 4 cc. are then used for two-minute scrub. Never add more cream to already present suds, but if necessary, rinse and repeat the washing.

HOW SUPPLIED: Bottles of 16 fluid ounces and 1 gallon and in 3 fluid ounce refillable hand dispensers. Specially constructed dispensers are available for attachment to wall or portable stand.

PRODUCER: Winthrop-Stearns, Inc., New York, N.Y.

*Trademark of Sindar Corp.

SUB-Q-PAK

PURPOSE: Disposable hypodermoclysis unit for subcutaneous administration of fluids.

DESCRIPTION: Each Sub-Q-Pak unit consists of a dispensing cap, air filter, Murphy drip, plastic tubing, with "y" assembly, two pinch clamps and needle adapters with protective covering. The unit is packed sterile, preassembled and ready for use. All equipment except needles is discarded after use.

HOW SUPPLIED: Boxes of 20 units.

PRODUCER: Abbott Laboratories, North Chicago, Ill.

DR. Pepys' Pages

Personal Diary
and Observations on
Medical Life
by MORRIS FISHBEIN

Sept. 27—In New York where Basil O'Connor assembled friends for a bon voyage dinner and here came Ernest Irons and Louis Bauer and Lawrence Saunders, Mayes, Biow, Doug Black, Milton Runyon, and Tom Rivers and Chester Keefer and Phil Owen and the staff of the National Foundation for Infantile Paralysis and many more. Fine food and beverages which Nick Bernard so efficiently arranged delighted the palate. Here Basil made a gracious and delightful address which so touched old Pepys that he was wholly lost for words—indeed a rare occasion.

Sept. 28—With Louis de Rochemont to preview the film of the A.M.A. and to consider the accompanying message which Wesbrook van Vorhis will say. At night with the Mayes to the Stork Club for dinner and had some few words with Sherman Billingsley, the noted mine host, and afterwards to play at gin with Marek whose book on music has just come from the press.

Sept. 29—Most early to embark on the *Queen Mary*. Here came Milton Runyon and his lady and Ted Phillips and the Murray Breeses and Zita Wist and much champagne flowed while Mark Soroko tried impatiently to crash the visitor's gate which nowadays they close far too soon.

Oct. 4—This day celebrating Mistress Pepys' birthday on board; for champagne cocktails came Alvin Brush, president of American Home Products, and his ladies and the Barksdale Penicks and the Leslies from Australia and the David Hymans from New York. Now all most merry for the voyage was smooth and uneventful with the usual ship frivolities and opportunity to read a dozen books including such words about Roosevelt as those of Miss Tully and of Stettinius and some new Crime Club mysteries and Overstreet's "The Mature Mind" as well as a half dozen copies of *Excerpta Medica*. Day after day writing notes to acknowledge remembrances from the Willard Greenwalds and Leo Hoffman's and Behrmans and great numbers of telegrams which delight the heart with their friendship.

THOUGHTS FOR THE DAY

Said Joseph Addison: "When vice prevails and impious men bear sway, the post of honour is a private station."

* * *

Said William Shenstone: *"The only kind of revenge which a man of sense need take upon a scoundrel, is by a series of worthy behavior, to force him to admire and esteem his enemy, and yet irritate his animosity by declining a reconcilation."*

* * *

Said William Osler: "The extraordinary development of modern science may be her undoing. Specialism, now a necessity, has fragmented the specialties themselves in a way that makes the outlook hazardous. The workers lose all sense of proportion in a maze of minutiae."

* * *

Said Frederick, the Great: *"My people and I have come to an agreement which satisfies us both. They are to say what they please, and I am to do what I please."*

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Oct. 5—In Southampton at one in the morning and then in the dawn disembarking with the usual accompaniment of inspections of documents. Thereafter by the boat-train to London and to Grosvenor House. And observed already that "merrie England" is not so merry any more for the people are poor having allowance of but a few pennies' worth of meat each week and no milk or anything resembling cream but a diet full of starches and some sort of ersatz coffee. And did you ever try a chopped spinach sandwich? I did! Bond Street and Regent Street full of shops displaying great amounts of luxury goods which are carefully labeled "for export only." Then too the pound just being devalued the advantage seems to be to the wealthy.

Oct. 6—To assemble with the Council of the World Medical Association at the headquarters of the British Medical Association and here were Charles Hill, Knudsen from Stockholm, Leuch from Zurich, Routley from Canada, Sen from India, Cibrie from Paris, Tornel from Spain and all the American contingent, but the Chinese war kept Yui at home.

This day discussions of world problems and the intimate affairs of the Association. In the afternoon with Hugh Clegg, editor of the *British Medical Journal* to a press conference held by Aneurin Bevan and it seemed to old Pepys that Bevan was most alert and thoroughly briefed as to all the problems that might arise, for he answered questions promptly and wittily. A young lady wanted to know why Sir Stafford Cripps went to Switzerland for his medical care to which Bevan replied that no doubt his condition had a subjective aspect.

And Bevan hinted also that the general practitioners would eventually be guided by a restricted list of diseases according to a nomenclature to be developed and he intimated that costs were exceedingly great but that he could not see the desirability of having patients pay their doctors some sort of fee for each consultation to avoid abuse of the service.

At night with the American contingent, Henderson, Sensenich, Cline, Barker and Bauer to the

Trocadero to dine with Lord Horder, Lawrence Abel, and some seven general practitioners of the Fellowship for Freedom in Medicine. After a fine dinner which apparently some few places can serve, each of the G.P.s made some comments on the problems of practice but there were none complimentary, one saying he averaged 46 seconds per patient in his surgery.

At the last, Dr. Magna of Canada said that he had spent some days interviewing various general practitioners and that quite a few were on the whole complimentary and thought that some day the thing might be made to work.

Another high point was a visit to St. Bart's Hospital and here visited the wards with surgeon Ross and with internist Christy. After carefully ridding ourselves of all but a few pounds by spending them, off by air for Paris, the last night in London being spent at the Athenaeum Club with Hugh Clegg, Wilson Jameson, chief medical officer under the National Health Act, and Fortescue Fox, editor of the *Lancet*.

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Paris—Not too gay because of numerous political crises which destroy stability. Who wants to invest or begin a new enterprise without the slightest certainty as to the future? So we ate at Tour d'Argent, Coq Hardi and Josephs, with luncheon at Rumpelmeyers; we visited Charvet and Sulka and the Lalique and Desty establishments.

At UNESCO conferred with Maurice Goldsmith who is now in charge of the division dealing with the popularization of science and also with Dr. Zhukova who talked about the international abstracting and indexing of medical literature and also of a section concerned with international medical congresses. This division seems full of conferences and little action; ideals are exhausted in talk and ideas die aborning because of lack of funds and motive power.

So *au revoir* to the Hotel Castiglione and off to Amsterdam first saying *adieu* also to the Gibbs who are off for Spain and to Charles Tucker and Lou Wolfson and their entourage after two exciting evening dinners.

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Amsterdam—To the Amstel where a wonderful room overlooking the river. First to see the offices and staff of *Excerpta Medica* which has its own little building and employs a mass of staff all systematically organized under Landshoff, Landsberger, Hutt and Warren, with Professor Woerdeman on the scientific end.

At noon to a welcoming luncheon at the Hotel d'l'Europe which has the best hors d'ouvres I have tasted in Europe. In the afternoon to see the shops including the Delft china and the old silver and antiques and at night to dine with the leading editors of *Excerpta Medica* from the four great Dutch Universities at the International Club. And here talked a little about indexing and abstracting.

Then next day at noon to luncheon with the chief medical editors of *Excerpta* and also the directors. Later to visit the University with Dr. van Loghem and to spend some hours in the National Blood Bank just established with its inspired young staff. And the next day away by plane for Copenhagen.

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Copenhagen—A smooth flight on K.L.M. where they serve Bols liquors with the meals and one can buy Haig and Haig pints for one dollar and a half. At the Angleterre met by Elizabeth Goettsche with flowers and some Danish money, useful particularly to the person just arriving because a few hours are needed in all these countries to find out about the rate of exchange. Immediately the ladies departed for the Royal Copenhagen, Bing and Grondahl and George Jensen emporiums.

At night to attend the dedication of the new home of the Danish Medical Assn. where one of the four Clemmensens, all of whom are doctors, presided. Here were distinguished physicians from all the Scandinavian countries. The new home is a former palace, admirably suited to its present use. The upper floor is reserved for the sons and daughters of physicians who are studying in Denmark. All were greeted with a beautiful statement by the presiding officer. One of the prominent features of the new home is an exhibit of paintings by doctors. Then we were taken back to the hotel by Dr. V. A. Fenger, a nephew of Christian Fenger.

During our stay in Denmark numerous conferences with Mr. Rordam and Mr. Ragocsy and with Lassen, Nissen, another Clemmensen, and Buchthal, and with the secretaries of the interior, foreign affairs and health, to plan the poliomyelitis conference in Copenhagen in 1951. Also dining at the homes of Rordam, Ragocsy and Nissen and with the Goettsche and Herz families. One learns to absorb repeated skols without tottering and overwhelmed by the graciousness of the hospitality.

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Zurich—By plane to the Baur au Lac, in Zurich, one of the most beautiful and best managed hotels in Europe. Zurich is a city of vast wealth; the streets are lined with banks and investment houses, jewelry stores, book stores, antique shops, and other emporiums and the whole city gives the impression of wealth. So dined magnificently at Widder's cafe, called Veeder in the local pronunciation; we walked the wide boulevards and narrow little streets across the river on which the swans float with the magnificence that characterizes the city.

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Milan—From Zurich by train to Milan. Now the weather is suddenly cold and rainy. Here come Dr. and Mrs. Arturo Castiglioni, the eminent medical historian and writer, now 75 years old and dined with him and two Italian doctors from the Schering Corporation.

Milan is the great business city of Italy. Here also the cathedral which houses on its wall Leonardo da Vinci's "The Last Supper," and a bomb had destroyed much of the walls on each side so that repairs are under way.

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Venice—One alights from the train and steps into a motorized gondola for the trip to the Royal Danieli, a palace now become a hotel. What thrill in the world is equal to Venice? Everything centers at the St. Mark's square. The lion of St. Mark typifies the city. Pauly's glass display merits an hour and the lace shops are startling in the volume and quality of their wares. The gondolas and your legs carry you anywhere on the archipelago because motor cars do not come into the city. The palace of the doges, the prisons, the Bridge of Sighs, the paintings—all too tremendous for a short stay. Venice can provide months of interesting times and leisurely contemplation. Startling was a blank space on a wall indicating a visit by Goering who removed the center from a frieze and carried it away. The piece has been found and is now in process of reinstallation.

On Sunday afternoon returning to St. Mark's square with its flocks of pigeons—found an orchestra playing and thousands of people assembled. The Madonna of Pellegrine, unharmed during the bombing of her home cathedral, was visiting the city. A great procession of priests carried her from the St. Mark's cathedral to a gondola. As she appeared coming from the door of the cathedral a great roar of handclapping and applause greeted her. She was carried majestically by twelve men, clad in their best, as the singers chanted her praises. The people were weeping and the scene is one that is not to be forgotten.

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Florence—The room overlooks the Arno River and down stream is the only bridge left standing by the bombing, the others temporarily replaced by steel construction left by the American military engineers. Here is the place where Elizabeth Barrett Browning died; here the home of Lord Byron. Here also are the castles of the Medici, the family that ruled for so many years. The galleries show paintings and sculpture by Michelangelo, Cellini, and many others. Here is the Venus de Medici delicately shielding her bodily treasures with delicate hands. The shops display wonderful goods in leather, and there seem to be literally hundreds of places displaying antiques. We dine in the Buca Lapi and with the Sang family who are here in the Buca San Raffieli, meeting several new Italian recipes and much typical Italian atmosphere. We drive high over the city to ancient Etruscan city that was alive some hundreds of years before even the Romans came. In Florence months or years may well be spent, working a little each day and contemplating its gorgeous treasures.

In Italy people come to work about nine, at one they quit until four and then they work until a little after six or seven. They have a word called "pronto" which is seldom used but if you want coffee made right away you ask for "dui expressi."

"Remember, Mrs. Gossidge, our imagination can play us some queer tricks."

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